FLIGHT
and
AIRCRAFT ENGINEER

Editorial Director G. GEOFFREY SMITH, M.B.E.
Editor - - C. M. POULSEN
Assistant Editor - MAURICE A. SMITH, D.F.C. (WING CDR., R.A.F.V.R.)
Art Editor - - JOHN YOXALL

FIRST AERONAUTICAL WEEKLY IN THE WORLD : FOUNDED 1909

Editorial, Advertising and Publishing Offices: DORSET HOUSE, STAMFORD STREET, LONDON, S.E.1
Telegrams : Flightpres, Sedist, London. Telephone : Waterloo 3333 (50 lines.)

COVENTRY: 8 - 10, CORPORATION ST. Telegrams : Autocar, Coventry. Telephone : Coventry 5210.
BIRMINGHAM, 2: KING EDWARD HOUSE, NEW STREET. Telegrams : Autopress, Birmingham. Telephone : Midland 7191 (7 lines).
MANCHESTER, 3 : 260, DEANSGATE. Telegrams : Iliffe, Manchester. Telephone : Blackfriars 4412.
GLASGOW, C.2: 26B, RENFIELD ST. Telegrams : Iliffe, Glasgow. Telephone : Central 4857

SUBSCRIPTION RATES : Home and Abroad : Year, £3 1 0. 6 months, £1 10 6.

Registered at the G.P.O. as a Newspaper

No. 2004. Vol. LI. May 22nd, 1947 Thursdays, One Shilling.

The Outlook

The Few

AFTER the England-Australia race in 1934 there were many who announced loudly that the average of British machines made a poor showing in comparison with the performance put up by the Douglas DC 2 flown by the Dutch pilots Parmentier and Moll, a commercial type which gained second place. The actual fact was, of course, that de Havillands designed and built the Comet for the race, and won it in fine style with Scott and Campbell Black at the controls.

One is reminded of this piece of British aviation history by the Battle of Britain figures presented to Parliament by Mr. Noel-Baker last week, which disclosed the fact that, whereas the official announcements made at the time indicated 2,692 enemy aircraft destroyed, in actual fact the correct figure, now ascertained from official German sources, was 1,733. Doubtless there are those who will be so disappointed with the smaller figure that they may be inclined to jump to the conclusion that the official British claims were deliberately "cooked," quite overlooking the fact that the R.A.F. achieved what it set out to do: win the Battle of Britain, and thus denying to Germany the last possible chance to invade us.

No one with any claim to a knowledge of the way in which air battles were fought can be surprised at the discrepancy between the original British claims and the figures disclosed by the German returns for aircraft required as replacements. During the opening and closing stages of the Battle of Britain, when the fighting was less intense and relatively small numbers were engaged, it was not quite so difficult for aircrews to follow a damaged German aircraft until it was seen to strike the ground or the sea. Consequently there was a tendency to underestimate enemy losses, many of which must have ultimately crashed far out of sight of our crews.

When the air fighting really got going, it was obviously next to impossible to ascertain with accuracy the numbers brought down. There must have been many instances of more than one British pilot firing at a German aircraft and damaging it, each quite unaware that a fellow pilot, or even several, had also fired rounds at the same machine. It was not exactly a matter of sitting in a comfortable deck chair on a cricket ground and ticking off the runs.

We think the Government did the right thing in publishing the correct figures, which detract no whit from the gallantry of those few to whom Mr. Churchill paid his immortal tribute. They won the battle, and whether they did it by bringing down 3,000 or 2,000 German aircraft is of no great consequence. They saved the country; that is what matters.

Recessional Ruminations

THERE is always a tendency in Great Britain to think of the United States of America as a country flowing with milk and honey (or some rather cynical variants of the expression). That even a great rich nation like America can have its depressions is, of course, vaguely realized here, but the fact is apt to be forgotten when a slump has been supplanted by a boom.

This week our American Newsletter gives an outline of present conditions in the U.S., and "Kibitzer," an Englishman resident in America, traces back the difficulties to their sources and forecasts what, in his opinion, is likely to happen in the next couple of years. Knowing America's powers of recuperation, he is not unduly pessimistic about the ultimate outcome of the "recession" (a modern American euphemism for slump), but the well-being of America is of intimate personal importance to each of us in this country, and thus a study of this week's "Kibitzer" is of more than passing interest.

Owing to pressure on our space, this American Newsletter has had to be held over for more than a week, but more recent reports from America indicate a growing disquiet there over the state of the American aircraft

industry, which is held to be suffering an "acute financial emergency." It is significant that the agitation, which has resulted in the introduction of a Bill in Congress, has its origin largely in Service circles (General Carl Spaatz, C.-in-C. of the U.S. Army Air Forces, is reported to have taken part in preliminary talks), and the "Dunkirk" held up to the American people is that the United States is being outdistanced by Russia and Great Britain in design, research and production. By way of adding realism, bombers were used in a mock attack on the American eastern seaboard.

One cannot, of course, entirely dissociate the present campaign from the fear that the Republican Government is likely to use whatever may be the American equivalent of our "Geddes Axe" period which followed World War I, and thus it is not, perhaps, necessary to take the present scare too seriously, but that there is a fire of not inconsiderable magnitude causing the smoke appears fairly certain.

We in this country have our own troubles and difficulties. The privately owned American airlines are showing a loss. So are our State-owned corporations, at least two of the three; but they are operating under much less favourable conditions Our aircraft manufacturing industry is not exactly flourishing, but it is hampered by shortages in men and materials rather than by serious lack of orders; and it has not been burdened with oversize and now redundant factories to the extent that its American counterpart has.

The Navy Wins

EARLY this year Mr. Lindgren briefly announced the Government's decision not to follow the recommendations of the Pakenham Committee, which had examined possible sites for a permanent flying-boat base, and which preferred Langstone Harbour to Cliffe. Not until now has the full text of the Committee's report been published. It shows quite clearly the reasons for the preference for the Langstone Harbour site: excellent weather and comparatively low cost. ("The Harbour is almost landlocked, and all the benefits of an impounded lagoon could be obtained by the construction of three relatively small barrages and the strengthening of the retaining bank where required.")

In the Memorandum on the Report the Ministry of Civil Aviation gives only one reason for abandoning the Langstone Harbour site: the technical installations in the neighbourhood of Portsmouth are difficult to move.

When one considers that Langstone has a much better weather record than the Thames estuary, that the work of making the Harbour suitable would cost far less than would the building of an artificial lagoon at Cliffe, and that flying-boat traffic from it would not cut across the air routes to the Continent, as would that from Cliffe, the Government's reason does not sound very convincing.

CONTENTS

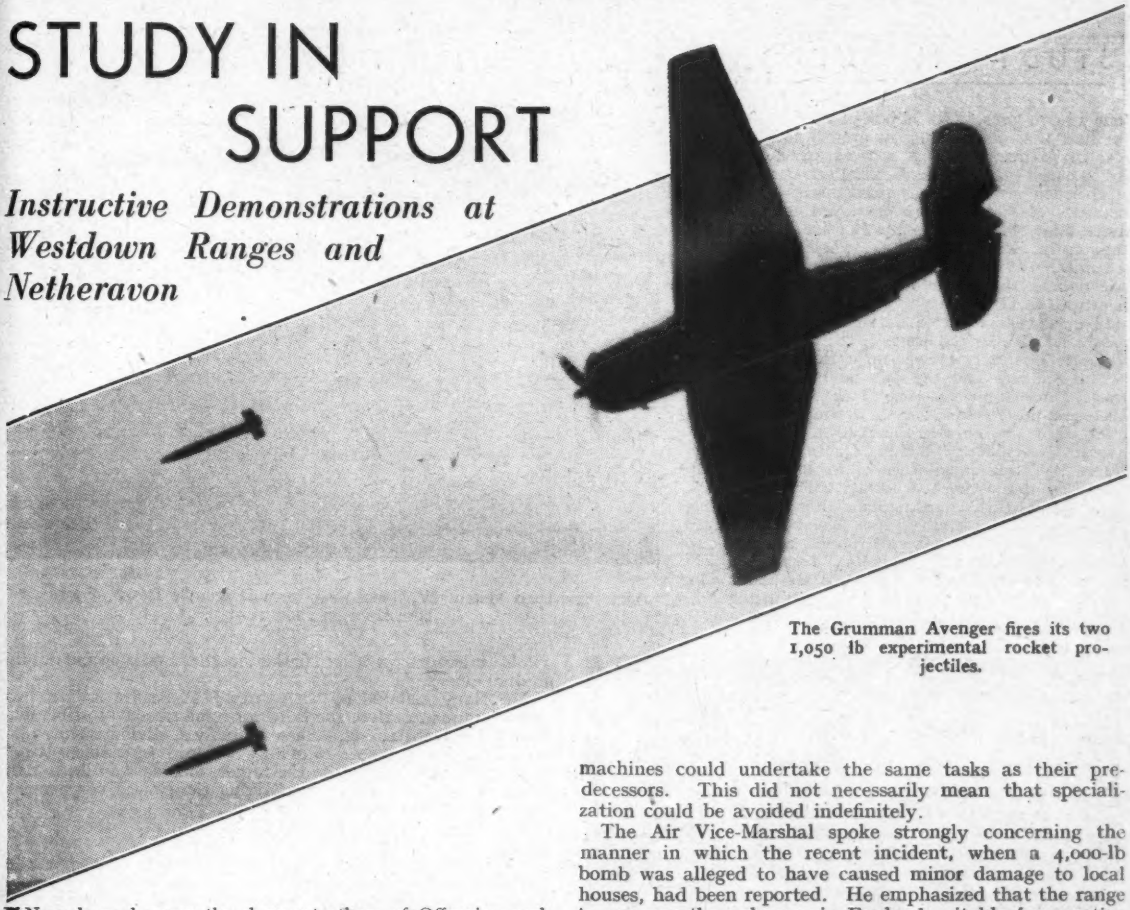
Outlook	459
Study in Support	461
KZ-VII in the Air	464
Activities at White Waltham	465
The Ypenburg Rally	466
Essex Aero Sprite	467
Naval Aircraft	468
Here and There	470
Percival Merganser	472
American Newsletter	475
Civil Aviation	477
Correspondence	481
Service Aviation	482

"Flight" photograph.

BREWING UP: A Vampire breaks away after contributing with its four 20 mm. guns to the fiery demise of a Halifax and Lancaster—targets for offensive support demonstrations at Westdown Ranges. An account of these demonstrations appears on the following pages.

STUDY IN SUPPORT

Instructive Demonstrations at Westdown Ranges and Netheravon



The Grumman Avenger fires its two 1,050 lb experimental rocket projectiles.

IN scale and scope the demonstrations of Offensive and Transport support staged respectively at Westdown Ranges and Netheravon on Tuesday and Wednesday last week, paralleled, and in some respects excelled, those given last August; which means that they were outstandingly impressive and instructive. As before, they were arranged for officers attending the Special Senior Course of the R.A.F. School of Air Support at Old Sarum, where representatives of the three Services, including those of the Dominions, are taught the science of combined army-air operations. For acceptance on this course officers must hold the rank of Major-General or equivalent. It was satisfactory to note eight good American names on the nominal roll.

In a specially prepared enclosure on the undulating and sparsely wooded Westdown Ranges near the Wiltshire village of West Lavington, A. V-M. L. O. Brown, C.B., C.B.E., D.F.C., A.F.C., who remains as the Commandant of the School, gave us a few of his ideas on the development of air support technique. We were trying, he said, to avoid developing specialized aircraft for army support, and it was gratifying to find that jet machines could undertake the same tasks as their predecessors. This did not necessarily mean that specialization could be avoided indefinitely.

The Air Vice-Marshal spoke strongly concerning the manner in which the recent incident, when a 4,000-lb bomb was alleged to have caused minor damage to local houses, had been reported. He emphasized that the range in use was the only one in England suitable for practice with bombs of this calibre, and that its loss to the Service would be serious. Enquiries suggest that the local damage was not, in fact, attributable to an R.A.F. "cookie," but to a detonation for which the Army may have been responsible.

Some deadly marksmanship with cannon and machine guns was the first demonstration on Tuesday. The aircraft engaged were three Spitfire XIV (two 20-mm and two 0.5in) and four Meteor III and a Vampire, each with

"Flight" photograph

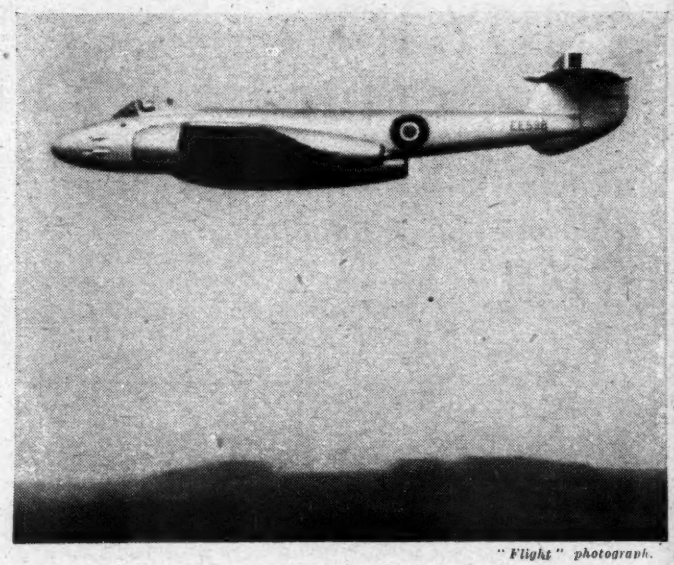
Officers attending the Special Senior Course at Old Sarum, in company with guests, intent on watching the bombs leave Lincolns of No 1 Group.

STUDY IN SUPPORT

four 20-mm guns. The object of their attack was to show that the strafing of ground targets with standard armament is not only accurate, but that it can cause considerable material damage.

This demonstration was particularly interesting because jet aircraft were employed, and it was noted that these, unlike the Spitfires, fired their cannon in sustained bursts. Though obviously accurate, these were not considered to be so effective as shorter bursts which permit realignment of the aircraft on the target. The Spitfires riddled some derelict M.T. vehicles, the Meteors soon kindled a raging fire in a Lancaster, and the Vampire resolutely brewed-up a Halifax.

The Spitfires and the jets having cleared the range, three Tempests—two Mark Vs and a Mark II—came in very low, the Vs to drop two dummy H.E. bombs apiece, and the II to release a pair of napalm non-ballistic "bombs" (actually auxiliary tanks filled with a mixture of naphtha and fuel oil). To obtain the best results with skip bombing, which this demonstration illustrated, the target should be prominent in side elevation. Tall buildings, embankments and tunnels are particularly worth-while. The napalm "bomb," which sprays its fearful flaming contents for about 300 yards, is principally of value in neutralizing pill boxes, trenches, woods and similar cover for troops.



"Flight" photograph.

The short-span Meteor IV, flown over from Boscombe Down, shows its slim form on a low run.

"Flight" photograph.

Air Marshal Sir Hugh Saunders, A.O.C.-in-C. Bomber Command (right) and A.V-M. L. O. Brown, Commandant of the School of Air Support, find something to amuse them between events.

Four Tempest Vs, with 250 lb H.E. bombs, were detailed to demonstrate air briefing by an Air Contact Team and dive bombing tactics. They represented a "cab rank" under the control of the Contact Team, operating from a "tentacle" (in future this will be an armoured 15 cwt vehicle), and briefing was done using a map with a local grid. As in the previous events, the targets were accurately marked with red smoke by the Royal Artillery. The Tempests made a good tactical approach, and their bombs seemed to be well on the wood designated as their target. In a typical attack of this kind the Tempests peel off at 6,000ft or above, dive at 40-60 deg. and release their bombs at 2,000ft, or slightly higher.

Four other Tempest Vs were first to demonstrate the use of rocket projectiles. They were using the new sight, and each was armed with eight 60-lb R.P.s. Again, their tactical approach was good, all being in the dive more or less simultaneously and firing at about 600 yards. On the first run each pilot got off two of his rockets at some tanks, but the second time round the first pair "rippled" their remaining half-dozen and the second two fired in salvo. The degree of accuracy registered spoke well for the new sight, but suggested that the pilots were very experienced in this most demoralizing and deadly form of attack.

The Navy followed up with three R.P. Seafire XVIIs, two of which fired in salvo, the third for some reason (possible due to baulking) abstaining. Then a Firefly I, diving steeply and close, hit the jackpot, slamming its load of sixteen tiered rockets simultaneously into the target, making way for a fast-flying Sea Hornet, likewise delivering tier-stowed 60-pounders —in this case eight.

Meet "Uncle Tom"!

After the Sea Hornet a lone, drab Avenger did not excite interest until what appeared to be a brace of baby torpedoes detached themselves from the wings and sped earthwards with a devilish din. They overshot their target, and the war heads proved inert, but this was not significant, as the projectiles were introduced by the commentator as the new experimental 1,050-lb "Uncle Toms," with 600-lb heads. This size of head is expected to give something near the effect of a 500-lb bomb. There was general disappointment and some strong feeling that, as the result of local protests—possibly ill-founded—4,000-lb H.E. bombs could not be dropped by Lincolns.

"Flight" photograph.

The views of A.V-M. J. N. Boothman, A.C.A.S. (T.R.), were highly valued. A.V-M. Boothman was attending the course at Old Sarum.

Twelve of these formed the main force for a demonstration attack after target marking by Pathfinder Mosquitoes. These twelve Lincolns, it was explained, represented a force ten times their strength, and the whole assault, including the marking, occupied the same time as would the full-scale operation—that is, about 13 min.

The Mosquito Pathfinders, using the old 5 Group dive-bombing technique, put down their red and green target indicators, and the master bomber, having assessed their accuracy, instructed the main force to aim to the left of the red ones. Thereupon the open file of Lincolns, with bomb doors yawning, droned over obediently to deluge the target area with fourteen 500-lb H.E. bombs each.

There followed a demonstration which, if lacking some of the spectacle of preceding events, was impressive because of its military implications. Four Mosquito XVIs of 139 Wing, B.A.F.O., bombed a small target under the direction of a Mobile Radar Control Post. This equipment enables aircraft to bomb with a high degree of accuracy in or above cloud from a point up to 35 miles away (at 10,000ft). During the war it was used for guiding fighter bombers in shallow dives through cloud to a previously selected target, but this aspect of its use has not been extensively developed. The Mosquitoes released sixteen 500-lb M.C. bombs with what appeared to be good results.

"Flight" photograph.

The Auster ambulance is not, as might be assumed, awaiting customers from among the paratroops who are, in fact, in better shape than the observers, being protected from the downpour by their "brollies" and equipment.

Jets Demonstrated

Finally, from nearby Boscombe Down, came several types of Service aircraft, notably a Meteor IV and a Vampire. The quality of the demonstrations by these two types was assured when one learned that the pilots were S/Ls. Duke and Zurakowski. Duke's machine, which he flew past initially at little more than 150 m.p.h., was of the latest clipped-wing type. He particularly impressed American visitors when he zoomed, after a 550 m.p.h. fly-past, at something approaching 20,000 ft/min, and rolled off the top of enormous loops.

"Zura" was in his usual excellent form. He seems to be able to fly any aircraft a little slower than anyone else, and he brought the Vampire (not Nene-engined, as announced) past the enclosures at a speed which would hardly have discredited a specialized Army co-operation machine. At the other end of his speed range he showed what the "Vamp" can do in all attitudes. Twice, after protracted zooms, he put it into a spin.

The performance of the remaining seven aircraft (Brigand, Lincoln II, Sea Hornet 20, Seafire 47, Sea Fury X, Firefly IV and Firebrand V) was, of course, overshadowed by the jets, though the Naval fighters seemed fast. The commentator's pronouncement that the top speed of the Firefly and Firebrand is only about 320 m.p.h. must certainly be questioned.

Slight rain had failed to mar Tuesday's display, but at Netheravon on the following day it was very heavy on occasions, and exasperating throughout. Fortunately, the aircraft in the static display included a number which offered sheltering wings. In addition to the Bristol Freighter, there were a Miles Gemini, Messenger and Aerovan, all calculated to interest the students on the Special Course. The Service types were a Viking, York, Lancastrian, Halifax, A.IX, Dakota IV, Sikorsky R.IV, Hamilcar, Horsa, Hadrian and Auster.

To open the display a Pathfinder team (one officer and seven O.R.s) dropped 600ft from a Halifax to set up a Eureka beacon and "68" set. Normally they would arrive about 30 min before the main force. Next came a second Halifax with a load of thirty-six dummy paratroops, as used for creating diversions during airborne operations. Battle noise simulators can be dropped to explode 15-30 min after these dummies have landed.

The main force arrived in three more Halifaxes. An officer and thirty-five other ranks, with three Bren guns, rifles, 2in mortars and "38" set, touched down accurately and were soon in action. The support company element, consisting of a company H.Q., mortar detachment, two medium machine-gun detachments and a section of carriers (forty-six "bodies" all told) were to have dropped from three Dakotas in vic formation, but were held off by the weather.

Accurately and on time, another Halifax dropped, from 1,000ft., a 6-pounder gun, four ammunition containers, a jeep and a gun crew of seven. This was to have been followed by a Horsa and Hamilcar, towed by a Dakota and Halifax respectively, but these were forced to return to base. Three more Halifaxes, however, got through with their thirteen containers each. Another three Dakotas then appeared with a total of twenty-four panniers, each weighing 350-400lb. A single Dakota dropped packages on a restricted D.Z., followed by ordnance stores, and finally by some more packages.

One of two Tempests, due to drop containers, broke off its mission through engine trouble, the second released accurately.

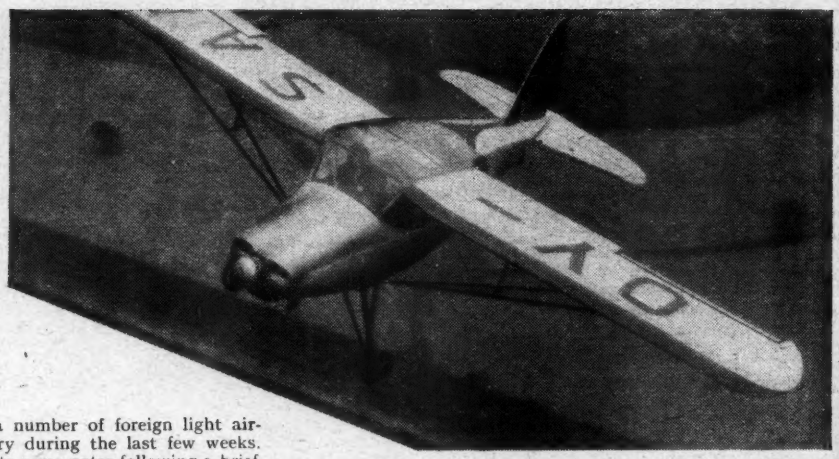
A Sikorsky R.4 having performed in its usual incredible manner, an Auster ambulance embarked, and took off with, a live "casualty," but the final item—a Dakota "snatching" a Hadrian—was baulked by a sudden change in wind direction.

"Flight" photograph.

The Miles contingent and the Bristol Freighter, in the rear of the Service "heavies," provided a welcome splash of colour on a rainy afternoon at Netheravon.

KZ-VII In The Air

Some Impressions of the New Lark



"Flight" photograph.

The broad nose and spacious interior are particularly apparent in this photograph.

THERE have been quite a number of foreign light aircraft visiting this country during the last few weeks. In last week's issue I wrote some notes following a brief flight in the Ercoupe, and one warm evening last week needed no persuasion to fly the Danish KZ-VII.

This four-seater KZ, also named Lark, will be of particular interest to aircraft-starved British pilots because, believe it or not, an import licence can be obtained and delivery dates are only about two months behind orders. R. K. Dundas, Ltd., the agents for Skandinavisk Aero Industri A/S in this country and the Commonwealth, would be glad to arrange delivery of a standard KZ-VII for a price of £2,150, £290 of which is duty, or of a de luxe model fitted with electrics and in non-standard colours for £2,300.

In our issue of August 29th last I described my impressions of flying the two-seater KZ-III Lark, and the VII is very similar, being in fact a four-seat version with a little more power and some improvements to detail. The engine is a C.125 Continental flat six, while the KZ-III had a 100 h.p. Cirrus Minor. To simplify and speed-up production, only one model is being produced, and as the main demand in Europe, also borne out by American experience, is for a four-seater, the KZ-III has been discontinued.

The principal flying characteristic of the Lark is the control at very low speeds and the aircraft's reluctance to stall and refusal to spin. While these safety qualities, which are becoming the talking point of so many modern light aircraft, are 100 per cent desirable, I think it is time a small warning notice was displayed on the windscreens, like the running-in instructions on a new car, to say that the aircraft should not be flown at less than 30 m.p.h. for the first thousand feet. More than one very experienced pilot has lost his life in the last year or so through overdoing the walking-pace-climb-off-the-deck demonstration. As far as the KZ-VII is concerned, any unintentional stall which might occur during normal flying practice would be due to abnormal pilot error.

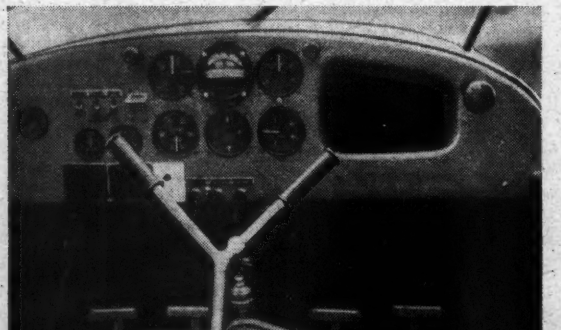
I tried a circuit and bump with three people up after first flying with only two, and could hardly detect any difference in handling. The climb figure of 590 ft/min claimed seems to be accurate, and, flown solo, 1,000 ft/min initial climb can be obtained. Over a short run I reached a speed of 195 k.p.h. or 121 m.p.h. at full throttle and cruised without effort at 175/180 k.p.h. or 110 m.p.h.

The main criticism of the earlier KZ-III was its lack of rearward view, but on the KZ-VII this is quite satisfactory, and the straight-forward view is also slightly improved.

For a machine of its type, the Lark's low landing speed of about 35 m.p.h. is a good feature, and although I wouldn't try it with someone else's aircraft, I am told by Mr. Kramme, the demonstrating pilot, and Mr. Harttung, the sales manager, that on grass the machine may be landed safely with brakes full on. For small-field work, in the mountainous Scandinavian countries in particular, this and its full load, still-air take-off run of only 165 yd will be most useful. The full-span two-position flaps, of course, have a lot to do with this low-speed performance. They are full-span in so much as both ailerons are depressed by 15 degrees when flap is fully lowered. Flown solo, the Lark can be pulled off safely after a 70-yd run, and an emergency landing could be made in little more than tennis-court area.

"Flight" photograph.

The Lark climbs steeply away from Gatwick airfield.



"Flight" photograph.

The panel layout is neat and simple and entry to front or rear seats presents no problem. For some people the "prongs" of the forked stick are a little too long.

KZ-VII LARK

Span	31.5ft
Length	21.5ft
Height	6.9ft
Wing area	140 sq ft
Weight empty	1,022 lb
Useful load	889 lb
Max. all-up weight	1,911 lb
Max. wing loading	13.5 lb/sq in
Power loading	15.3 lb/h.p.
Max. speed S.L.	124 m.p.h.
Max. speed (2,350 r.p.m.)	109 m.p.h.
Landing speed	34 m.p.h.
Rate of climb S.L.	590 ft/min
Range	450 miles
Service ceiling	13,500ft

Two points which I noticed in the air were the greatly increased effect of the fore-and-aft trimmer and a slight vibration of the tail felt through the stick and airframe, and visible particularly on the elevator horns when climbing at round about 75 k.p.h. I am told that this had been noted and is being corrected.

The effect of the trimmer control has increased because it now causes a change in tailplane incidence as well as moving a tab. This provides for the relatively large changes in trim occasioned by the carriage of either one or four people. Other recent improvements found on the Lark are a cleaned-up undercarriage and a steerable tail wheel coupled up with the rudder but also capable of castering. The brake operation is not quite all that could be desired, but the best positions for taxying would soon be learnt with experience. The fault, if any, lies not with the brake units but with the differential link-up with the rudder pedals. The centrifugally operated Aeromatic v.p. airscrew improves performance.

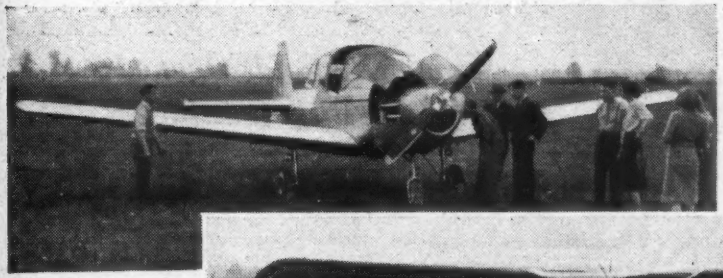
A plain instrument panel with good-sized cubby hole and a roomy four-seat layout are interior characteristics. Two fuel gauges are provided in the wing roots and the two tanks holding a total of 24 gallons are themselves in the wings. The dual throttle knobs protruding from the instruments panel are a happy compromise between push-pull knob and lever. They move in and out but also describe a small arc, and a good friction adjuster is provided. No adjustment is provided for the seats, but rudder pedal reach can be altered on the ground.

On reflection, I felt that a paragraph from the makers' catalogue aptly and honestly sums up the KZ-VII. "It may not be the fanciest looking or the speediest plane of to-day, but it is a thoroughly sound job, easy to fly and cheap to operate."

Those who have a soft spot for the old D.H. Hornet will find some similarity between it and the Lark which is undoubtedly a good, safe club or private machine well suited to instructional or cross-country work. M. A. S.

ACTIVITIES AT WHITE WALTHAM

Several Foreign Aircraft to be Seen : Two-control Flying Sampled by Some Experts



(Above) After its first flight in England the North American Navion is looked over by the pilot and ground engineers.

The KZ-VII, also illustrated on the previous page, flew in during the afternoon and caused considerable interest as a potential economical four-seater for British clubs or private owners. It has a 125 h.p. Continental engine and Aeromatic centrifugal v.p. airscrew.

Last-minute consultation before Colonel Ackerman, U.S. Army, flew the Navion. By comparison with the Auster (visiting from Redhill) in the background, it appears a large aircraft.

(Left and above) Two views of the Ercoupe which has been demonstrated in this country and on the Continent. The Gemini in the background of both pictures was recently acquired by the M. of S. The aircraft just visible on the right is a Fairchild Argus.

THERE has been some unusual activity among light aircraft at White Waltham airfield during the last week or two. The West London Club and its five affiliated clubs reckon to keep their respective Minors, Hornet, Magisters, Austers, etc., in the air on all fine days, and a group of parked Brigands lends a business-like air to the place. Proctors and Oxfords fly in and out, and Fairchild Argus' and all manner of other types are seen in various stages of inspection and conversion

The Women's Junior Air Corps took official delivery of their Fairchild (photo page 471), paid for by its members. Some of the recent special activities are illustrated on this page. Col J. D. Ackerman, of the U.S. Military Attaché's department, made a first test flight of his Navion which has recently been uncrated and assembled.

As mentioned last week, Mr. J. L. Zenitz has been demonstrating the two-control Ercoupe at White Waltham and elsewhere, and in our photographs members of the Informal Light Aeroplane Committee who flew it may be seen examining this and other machines. The Danish KZ-VII four-seater and the low-wing Czech Falcon (Sokol), described in *Flight* of June 20, 1946, were also present. Another visitor illustrated is a new M. of S. Gemini which is destined eventually for Washington.

"Flight" photograph.

Hague Airfield Opened: Large British Contingent

The Ypenburg Rally

H.R.H. PRINCESS JULIANA of the Netherlands officially opened Ypenburg airfield, the Hague, on Friday, May 16th. She was accompanied by Prince Bernhard, who had arrived earlier by air in a Stinson Sentinel. The opening ceremony marked the beginning of the first post-war international air rally organized by the Royal Aero Club of the Netherlands, at which twenty-eight aircraft and seventy-five people from Britain attended. The aircraft included Messengers, Consuls, Whitney Straights, a Hornet Moth, 7 Proctors and 8 Austers. America, France, Belgium and Denmark were also represented.

On Friday, Saturday and Sunday afternoon large crowds gathered at the airport to watch stunt and demonstration flying and inspect the large array of civil aircraft. It was estimated that 25,000 people were at Ypenburg on Sunday.

The programme of entertainment for the British guests started with dinner at the Hotel Kurhaus, where D. H. Damme, president of the Royal Aero Club of the Netherlands, welcomed the visitors. Mr. S. Kenneth Davies, vice-president of the Royal Aero Club, thanked Mr. Damme and members of the Royal Netherlands Aero Club on behalf of the English participants, for the invitation to Holland and the wonderful way in which they had been received.

Visit to Schiphol

On Saturday the guests were taken by bus to Schiphol airfield, where they were received by Mr. Dellaert, managing director of Schiphol. Lunch on the airfield was followed by a boat trip on the canals to Amsterdam, where tea at the Amstel Hotel, offered by the Gooi-Stichtse Aero Club, was partaken. Saturday evening was concluded with a dinner and dance in the Hotel Kasteel Oud Wassenaar.

There were no fixed entertainments arranged for Sunday morning. Some of the party toured the Hague at their leisure, whilst a good deal of flying took place from the airfield. Several interesting aircraft were on show including a Fokker "Promoter," a Swiss Bücker "Jungmann" and a French pusher type "Courlis."

On Sunday afternoon the flying display included a very well executed parachute descent by the French woman parachutist Michelle Bellu. She landed directly in front of the crowds outside the control tower. During the afternoon a point-to-point air race took place, with spot landings and other tests of skill included in the course. Teams of three competed, and later in the afternoon, at a cocktail party given by the Royal Yachting Club "de Maas," the Ypenburg Cup was presented to the winning Dutch team, who raced in a Piper Cub.

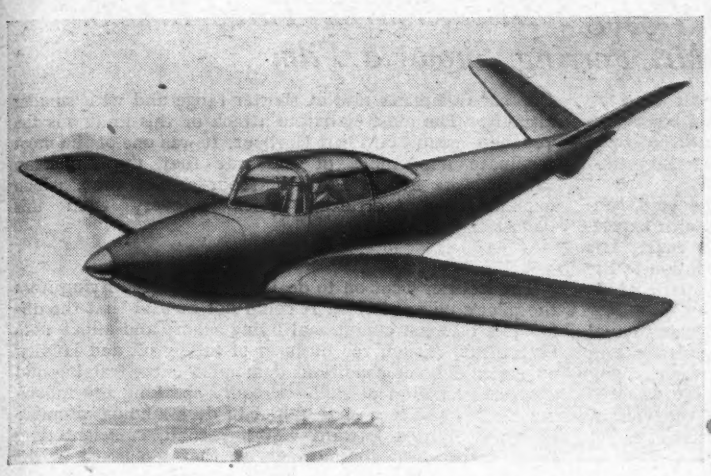
On Monday most of the British party departed in their own aircraft to Eindhoven airfield to inspect the Phillips works. Lunch was taken at Eindhoven, after which the return journey to Ypenburg and departure for England was made. Several pilots encountered bad weather on the leg home, and three aircraft had to put into Ostend on account of very low cloud over the water.

Special thanks must go to Mr. H. Montauban van Swijndregt and Mr. C. Kolffe, the secretary-general and vice-president of the Dutch Club respectively, upon whose shoulders a large part of the planning rested. The whole organization was excellent and there was not a dull moment during a very pleasant week-end rally on the Continent. We hope to see many of our Dutch friends at the international rally to be held at Derby in July.

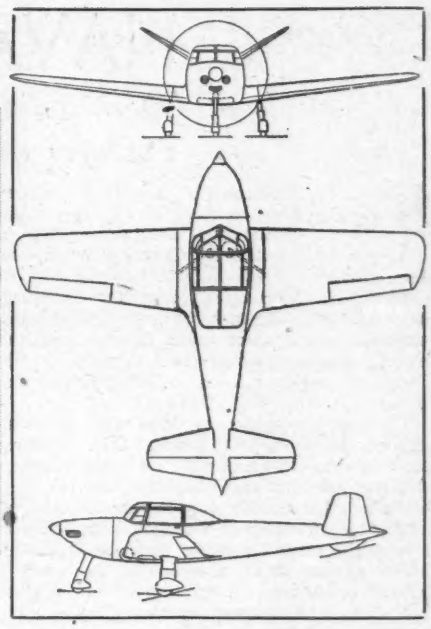
"Flight" photograph.

AT THE HAGUE: Princess Juliana of the Netherlands watching aerobatics at the Ypenburg air rally on Saturday last. Twenty-eight aircraft from Britain took part. The aircraft in the background is a Fokker F25 Promoter.

Essex Aero Sprite



An artist's impression of the all-magnesium Sprite two-seater. The design is based on the new Nuffield 100 h.p. engine.



THE names of Essex Aero, Ltd., and its managing director, Mr. R. J. Cross, are well known in the aviation world, especially in connection with light-alloy fuel and oil tanks. Mr. Cross has long been a fervent advocate of magnesium, and it is thus scarcely surprising that he should ponder the possibilities of an all-magnesium aircraft. A design for such a machine is now being produced at the drawing office at Gravesend, and the table below gives the estimated data for the two versions contemplated, one with retractable and one with fixed undercarriage.

ESSEX AERO "SPRITE"
Nuffield Engine

	Dimensions	
	Retractable Undercarriage	Fixed Undercarriage
	ft in	ft in
Length o.a.	24 7	24 7
Wing span	30 0	30 0
Tailplane span	10 10	10 10
Height o.a.	7 10	7 10
Track of undercarriage	7 6	7 6
Airscrew diameter	7 6	7 6
Gross wing area (sq ft)	150	150
Weights		
	lb	lb
Tare weight	921	879
Pilot and passenger	360	360
Fuel (25 galls)	181	181
Oil (2 galls)	18	18
Luggage	60	60
Radio	50	50
Gross weight	1,590	1,548
Normal weight (as above, but with only 10 galls of fuel)	1,482	1,440
Disposable load	669	669

Estimated Performance

	Normal Wt.	Gross Wt	Normal Wt	Gross Wt
Speed (m.p.h.):				
Max. at sea level	149	148	141.5	140.5
Max. at 1,000ft	147.5	147	140.5	139
Max. at 7,750ft	138.5	—	131	—
Max. cruising (73 h.p. S.L.)	130.5	129	124	122.5
Max. cruising (73 h.p. at 1,000ft)	131.5	130	125	124
Cruising at 70 h.p. S.L.	128.5	127	121.5	120.5
Cruising at 70 h.p. at 1,000ft	129.5	128	123	121.5
Stalling (flaps down)	43.8	45.3	43	44.5
Stalling (flaps up)	51.7	53.5	51	53
Initial rate of climb (ft/min)	744	653	760	680
Absolute ceiling (ft)	17,400	—	17,300	—
Service ceiling (ft)	14,600	—	14,500	—
Time to 7,750ft (mins)	15	16.5	14.5	16
Max. range at 1,000ft (miles)	305 *	790	290 †	760
Endurance (hours) at max. cruising speed at 1,000ft	1.85	5.1	1.85	5.1

* At 100 m.p.h. † At 95 m.p.h.

These performance figures are based on the following engine data: Max. output 100 b.h.p. at 2,600 r.p.m.; cruising output 73 b.h.p. at 2,300 r.p.m.

Apart from the fact that the "Sprite" two-seater is to be built of magnesium, it is interesting to find that it has been based upon the new Nuffield engine; from this fact one may deduce that it will be some little time before the machine is likely to be flown. Estimates indicate the end of the summer, but in any prototype there are numerous possibilities of hold-ups through unexpected causes, and it would be strange if the Essex Aero Sprite should prove an exception.

From the artist's impression and the three-view general arrangement drawings it will be seen that the Sprite, in its main outlines, is somewhere between the Beech Bonanza and the North American Navion, some flying impressions of which were given in our issue of May 1st. The "butterfly" tail of the Bonanza is coupled with a cabin superstructure resembling that of the Navion. The Sprite is, however, a much smaller and lighter machine, and the Nuffield engine is expected to give a maximum of 100 h.p., whereas the Continental engines of the two American types are rated at 165 h.p. and 185 h.p. respectively, and the machines are four-seaters.

The use of a "butterfly" tail is novel for this country. We believe we are right in saying that Mr. Cross chose it mainly for reasons of economy in manufacture. It may be recalled that our contributor, in his article on the Bonanza and Navion, stated that in normal flight the machine with the "butterfly" tail handled exactly as a more orthodox type, but that in rough air it was inclined to yaw too much and to be heavy on the rudder.

Progress with the Sprite will be watched with interest, and when the design is a little farther advanced we hope to deal with the magnesium structure in some detail.

BRITISH AIRSCREWS MADE IN FRANCE

AN agreement has recently been concluded between Rotol, Limited, and the Société D'Aviation Louis Breguet whereby the whole range of Rotol airscrews are to be manufactured under licence in France for marketing throughout France, her colonies and mandated territories. The validity of the licence is for a period of seven years and provides for interchange of all design improvements. It is understood that Breguet are to concentrate initially on manufacture of the four-blade braking airscrew—now being developed by Rotol for the Rolls-Royce Merlin civil transport series—and to adopt the design for installation to the Gnôme et Rhône engines of the Breguet 761.

NAVAL AIRCRAFT

Aspects of Operational Flying : Discussion on Three R.Ae.S. Lectures : Mr. Perring Shows a Film

FOLLOWING the Papers on naval aircraft read by Mr. W. S. Farren and Mr. L. Boddington before the Royal Aeronautical Society on May 7th, a third Paper was presented by Cdr. F. M. A. Torrens-Spence, D.S.O., D.S.C., R.N.

Like Mr. Boddington, Cdr. Torrens-Spence paid considerable attention to history, particularly his own experiences in the Mediterranean during 1940 and 1941. His outline of operations will be a valuable contribution to the literature of Naval Aviation, but it is to other parts of his paper that our space will be devoted.

Discussing typical operations of the war in which naval aircraft featured prominently, Cdr. Torrens-Spence said that these could be divided into four classes, each having different objects and characteristics. The first was the covering of our own shipping movements in the face of action by enemy shore-based aircraft, submarines or naval forces, the second was the converse of the first—offensive action against enemy shipping at sea; the third was listed as the deliberate engagement of our ship-based aircraft with enemy shore-based aviation at short range, to cover a military landing or evacuation; and lastly there was what the lecturer called the "set-piece" raid against an enemy shore base or special target.

TWO of the three Papers on Naval Aircraft, delivered before the Royal Aeronautical Society on May 7th, were summarized in last week's issue of "Flight." On these pages the third Paper, by Cdr. Torrens-Spence, is dealt with in the same manner, and is supplemented by points from the lengthy discussions which followed all three lectures.

Although the first type of operation was a defensive function, the lecturer considered it to be a fundamental operation of the Navy. Nowadays shipping at sea was continuously exposed to submarine and shore-based attack, and unless defence could be put up against these attacks there was no reason why the enemy should go to the trouble of building a surface fleet. In the last war we did not achieve tolerable fighter defence for our convoys until 1943, which resulted in colossal losses of shipping, yet during these first few years vast numbers of aircraft were being manufactured for uses which might now be considered to have represented an uneconomical expenditure. It frequently happened that only one fighter would have been required to destroy an enemy reconnaissance aircraft and prevent disaster as the result of submarine attack. The lecturer went on to refer to the "catafighters" and mentioned that it was not a fair criterion to compare the number of enemy aircraft shot down with our own air losses. What mattered was that ships had been saved.

Personal Interest

Concerning standing air cover, the economy of the carrier, compared with shore-based aviation, was emphasized. Moreover, the fighter pilot from a carrier had an intense personal interest in the protection of the ships under his charge: he was endeavouring to prevent his own home, messmates and personal property from being sent to the bottom.

The orthodox doctrine accepted before and during the early part of the war was that the deliberate engagement of ship-based aviation to cover a military landing or evacuation was not practicable owing to the inferiority of naval aircraft and the vulnerability of carriers. As it turned out, this was proved false, the explanation lying in the fact that the carrier had the advantage of mobility, and therefore of initiative, concentration and surprise. The American advance across the Pacific was achieved entirely by operations of this kind.

The "set-piece" operation was rather similar to a Bomber Command raid at shorter range and with smaller aircraft. The most elaborate attack of this kind was the Japanese assault on Pearl Harbour. It was one of the most fortunate happenings of the war that the American carriers were not in Pearl Harbour at the time, which explains the Americans' quick recovery from this devastating blow.

Aircraft Characteristics

The lecturer went on to deal with ship-based flying from the pilot's point of view. It could not be said that the differences between operational flying ashore and afloat were very great, though the business of taking off and landing on under difficult conditions demanded extra training and a specialized form of skill. Broadly speaking the following characteristics were required in deck-landing aircraft: First, unimpeded forward view; second, sufficient drag to ensure a steep gliding angle so that too much height would not cause a prolonged float over the wires. (In the case of jet aircraft, a "decent amount" of drag also enabled the turbine revolutions to be kept up during the approach, so that quicker control of thrust could be obtained. In this connection the Vampire was now being tried with the throttle lever inter-connected with a drag flap, so that the drag was reduced as the thrust increased and *vice versa*.)

The third requirement, a tricycle undercarriage, was fundamentally right because it eliminated the bugbear of the deck-landing pilot, which was the bounce over the wires into the barrier. The snag was that it also encouraged fast landings, thereby requiring heavier and stronger arrester gear. As yet, we had gained little experience in the deck-landing of jet-propelled tricycle aircraft. It was also important that the landing gear should be capable of absorbing a high rate of descent without bounce or damage to the aircraft.

Good lateral control at approach speed with flaps down was requirement number four. Corrections for line on the approach were done by the use of aileron, but this feature became less important if there was a good forward view. Requirements five and six were good warning of the stall with flaps down and power on, and good longitudinal stability, to facilitate keeping a steady speed. Next came absence of directional and lateral changes of trim with power. This could only really be met with contra-props or pure-jet aircraft. Longitudinal change of trim with power, flaps down, should also be kept small.

The lecturer felt that continual flying over the sea on one engine, with wartime maintenance standards, put more nervous strain on aircrews than did operational hazards. A very great economy in aircrew training and replacement would be effected by the use of twin-engined aircraft. A particularly interesting point made by Cdr. Torrens-Spence was that in the last war the submarine was found to be a very valuable instrument of air/sea rescue.

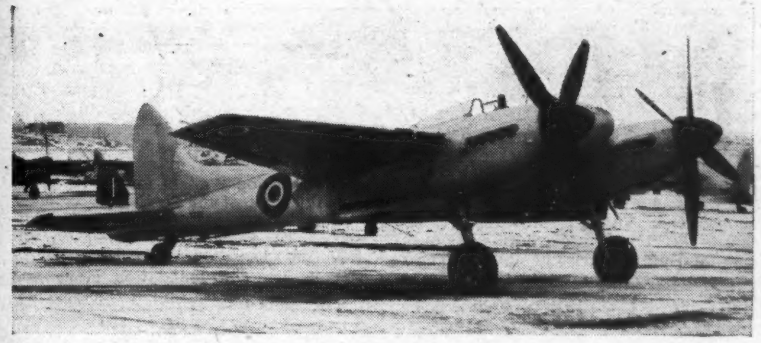
Considering the aircraft carrier as a unit of the Fleet, the lecturer emphasized that, although he regarded the carrier as the foundation of sea power under present conditions, there should be no illusion as to its dependence on other classes of ships. When its aircraft were "grounded" the carrier became a useless liability, and the battleship was once again supreme. Accordingly, it was important to develop means of landing aircraft on a deck in fog.

If the carrier was to be laid out as an efficient floating

airfield, its A.A. gunnery arrangements must be somewhat restricted and the majority of guns distributed among cruisers, battleships and destroyers.

The effective unit of sea power, instead of being a single battleship, was now a collection of ships of different classes centred on the carrier. If any one class of ship was deficient the unit became vulnerable to some particular form of attack.

The modern formation of the fleet and task force was very different from that in vogue at the beginning of the war. Carriers were disposed in a square, with a cruiser in the centre as guide, upon which all ships kept station. The battleships and cruisers were disposed among the carriers in a regular formation and the whole was surrounded by a circular destroyer screen. The formation rather resembled a diamond.



A recent type of deck-landing aircraft: the de Havilland Sea Hornet (two R.R. Merlin). The dorsal fin extension has been added to comply with new requirements for directional stability, with feet off the rudder bar, in the event of one engine failing.

presented an anti-aircraft and anti-submarine hedgehog capable of being turned in any direction, all ships together, to suit the flying requirements of the carriers. It has been found possible during the war in the Pacific, by an elaborate supply system for fuel, stores and ammunition, to keep task forces of this type in the battle area for six weeks continuously.

The lecturer recalled, in considering the vulnerability of the carrier, that there was what might be called the Seversky school of strategists, who held that the carrier would be sunk by shore-based bombers, and those who believed in the big gun of the battleship as the means of destruction. It was thus interesting to note that in spite of the millions of miles steamed by our carriers in waters open to enemy air attack, not one was sunk by shore-based aircraft.

Cdr. Torrens-Spence went on to give such a lucid and concise account of the capacity of the carrier and the method of operation that this is quoted in full:

"In the Pacific, the *Illustrious* class were operating fifty aircraft, carrying thirty-eight in the hangar and twelve on deck. The later fleet carriers were operating slightly more, but the exact number depends primarily on the size of the aircraft. The normal frequency of take-off is about one aircraft per 15 sec., or, using a single catapult, one aircraft in 50 sec. Thus, for a 'set-piece' operation of the type which I have mentioned, fifty aircraft could be got off each carrier in 20-25 min by combined catapulting and unassisted take-off.

"The fleet carrier's deck is about 740 ft long and 50-90 ft wide. There are ten arrester wires with a pull-out of up to 140 ft. The landing area is about half the total. The deceleration imposed on the aircraft depends, of course, on the speed of entry into the wires, and 2 g is a typical figure at the present time. The landing-on interval is about 30 sec. This is made possible by the safety barrier which is lowered as soon as each aircraft comes to rest. The aircraft, therefore, only has to taxi over the barrier to allow it to be raised so that the next aircraft can land-on. Each lift can only strike-down aircraft at the rate of one every two minutes. Therefore, if you land-on twenty aircraft in ten minutes you will fill up the deck park and have to wait until the aircraft are struck down before landing-on any more. The delay would be about 15 min using both the lifts.

"Generally speaking, when operating the carrier the flow of aircraft within the ship is forward on the flight deck and aft through the hangar. Ranging-up is mostly done aft and striking-down forward. If you have less than, say, twelve aircraft in the air, the remains of the deck park must be shifted forward when landing-on and aft when taking off. An elaborate internal organization is required to control the movements and maintenance and arming and fuelling of this number of aircraft in the confined space. Power folding of wings is essential nowadays, since it effects an enormous saving in time and manpower."

The current Naval fighter, said Cdr. Torrens-Spence, was the Seafire XV (single-stage Griffon) for defence and short-range escort and strikes. This was being replaced by the Sea Fury and Seafire 47. Thereafter it seemed probable that turbine jet fighters would be used. Jet propulsion would confer many advantages. Space being at a premium the smaller size of jet fighters was a great advantage. The safer fuel reduced the hazards to the ship, and there was no need to warm up the engines before take-off. The saving in maintenance personnel was another important advantage and the jet aircraft was ideally suited to the tricycle undercarriage. The biggest problem was that of getting adequate endurance. There was much work to be done in evolving a new deck-landing technique.

Cdr. Torrens-Spence's lecture being concluded, a remarkably instructive film illustrating the development of deck-landing technique was shown by Mr. W. G. A. Perring, F.R.Ae.S. Included were some unique shots of early arrester trials at the Isle of Grain, and some revealing studies of some of the latest Naval aircraft photographed in slow motion from cameras outrigged from a carrier's side. Particular interest was aroused by the shots of barrier tests, using unmanned airframes.

THE DISCUSSIONS

AFTER each of the three papers had been summarized by its author a short discussion ensued, and in the evening there was a general discussion on matters which had arisen during the day.

Sir Charles Lillicrap, Director of Naval Construction, said that the flexibility advocated by Mr. Farren could be carried so far, but the time came when possible alternatives destroyed the balance of design. He was not sure what Mr. Farren meant when he said that the potentialities of the carrier had not been developed, and referred to a retardation of 3g which had now been accepted—double the figure specified in the past. Catapult speeds greatly in excess of 66 knots should cater for future requirements.

Sir Charles made mention of a meeting held between his Department and aircraft designers, which had had very satisfactory results. If designers felt that they were suffering under handicaps, he said, they should ask for another meeting.

Admiral Sir Philip Vian could not understand how Mr. Farren's "undercarriageless" aircraft could land on shore. Mr. Farren admitted the problem.

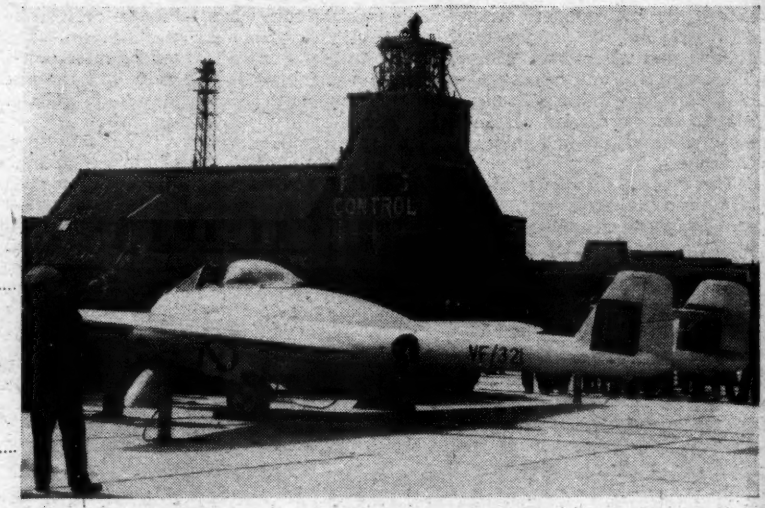
Mr. Hollis Williams looked ahead to Naval aircraft with swept-back wings or of Delta form, with inherently low lift characteristics.

Rear Admiral Slattery strongly emphasized his view that designers should concentrate on developing essentially *good* aircraft which could be adapted for various duties. The Mosquito, he said, was the outstanding example of such a machine. On the question of maintenance, he said that the Navy did not need an aircraft which was easy to maintain but one which needed no maintenance. In this connection he referred to the English love of tinkering with mechanical vehicles.

Mr. Davenport, after mentioning a figure of 500 lb weight, necessarily added by power folding on a certain design, went on to refer to the weight "snowball" to which A.T.O., increased structure weight

(*Concluded at foot of page 476*)

HERE AND THERE



ON SHOW : The de Havilland Vampire at Melsbroek airfield, near Brussels, where it was recently demonstrated before Belgian officials. It was at Melsbroek that Britain's first jet fighter squadron of Meteors was stationed during the war.

"Rr" is for Radar

MARINERS' charts of the world will be marked with the symbol "Rr," signifying radar, as distinct from radio, the symbol for which is "R." This is one of the many details settled at the Fifth International Hydrographic Conference just ended at Monaco.

Gas Turbine Presentation

THE National Gas Turbine Establishment and Power Jets (Research and Development), Ltd., is presenting a Whittle-type gas turbine aircraft engine in running order to the University of Louvain. The Faculty of the University has agreed that the engine shall be accessible to engineering students of other Universities in Belgium.

The engine is to be presented by Dr. Roxbee Cox, director of N.G.T.E., and Mr. W. E. P. Johnson, a director of Power Jet (R and D), Ltd., on May 23rd.

Burma Reunion

A STRONG R.A.F. representation is expected at the Burma Reunion to be held at the Royal Albert Hall on June 2nd. Air Marshal Sir Alec Coryton, who was one of the R.A.F. commanders associated with the campaign in which the air played such an important part, will be the spokesman for his Service. It is hoped that Viscount Mountbatten will speak direct from India during the evening, and prominent stage and radio stars will be there to entertain the 6,000 for whom accommodation is arranged.

The show will be compèred by Ralph Reader. Tickets, 3s 6d each, are obtainable from Burma Reunion Committee, 49, Pall Mall, S.W.1. All holders of the Burma Star are eligible.

Air Power Wins

GENERAL PAI CHUNG-HSAI, Minister of Chinese National Defence, told cadets at the Chienchias Air Force Academy in Hangchow that air power has superseded naval power as a decisive factor in warfare. It was all the more necessary that China's heavy industry should be speedily developed to put China's budding air force on a firm foundation, he said.

Aldershot of the Air

AT a foundation stone ceremony of a Services Club at Wendover on May 17th, Lord Cottesloe, Lord-Lieutenant of Buckinghamshire, said that Halton R.A.F. station "might almost be called the Aldershot of the air."

The club will cost £15,000 and will be run by Toc H, whose padre founder, the Rev. P. D. Clayton, conducted the ceremony. The foundation stone was dedicated by the Bishop of Buckingham.

Horsa Home

MR. T. SMITH, of Filton, Bristol, has no worries about the housing shortage. Showing praiseworthy ingenuity, he lately purchased an ex-D Day Horsa troop-carrying glider for £60 and is busy transforming it into three caravan trailers, each capable of sleeping four persons.

Photographic Policemen?

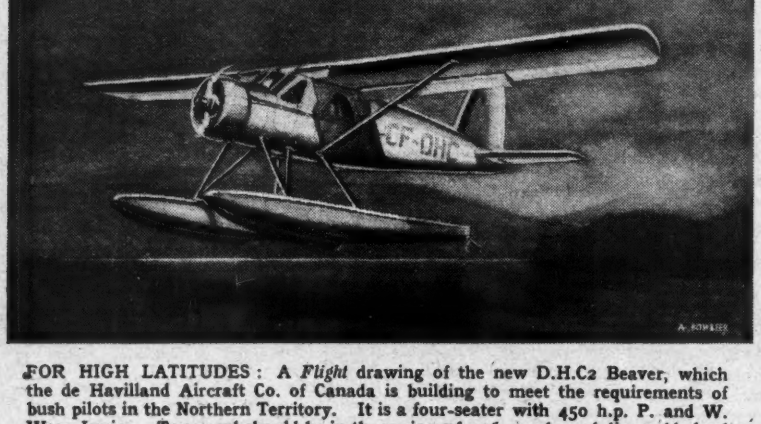
ADDRESSING the Royal Society of Arts in London last week, Dr. D. A. Spencer, technical adviser to Kodak, Ltd., stated that the technique employed in aerial reconnaissance during the war could be applied directly to the policing of Germany after the withdrawal of the occupational forces. Dr. Spencer's idea is that a comparatively small number of specialist interpreters could direct teams of ground investigators to areas in which air photography revealed suspicious activity.

B.I.F. Worth While

THE B.I.F. Exhibition, so aptly referred to as the shop-window of Britain, closed last Friday. Space does not allow us to list all the manufacturers connected with the aircraft industry who were exhibiting, but *Flight* representatives attended the B.I.F. last week and visited many of their stands. The high standard of workmanship of the products on view, and the ingenious methods used in their display, must be commented upon. The general feeling appeared to be that enquiries from overseas buyers had reached, and in many cases exceeded, expectations.

Turkish Delegation at Woodley

MEMBERS of the Turkish Parliamentary delegation now in this country at the invitation of the Speaker of the House of Commons, paid a visit to the Miles aircraft factory on May 13th. During a tour of the factory they saw the Marathon, Merchantman, Gemini, Messenger and Aerovan under construction



FOR HIGH LATITUDES : A *Flight* drawing of the new D.H.C2 Beaver, which the de Havilland Aircraft Co. of Canada is building to meet the requirements of bush pilots in the Northern Territory. It is a four-seater with 450 h.p. P. and W. Wasp Junior. Top speed should be in the region of 146 m.p.h. and disposable load slightly less than 2,000 lb.

HERE AND THERE

and, later, witnessed flying demonstrations of the Gemini, Messenger and Aerovan. The delegation was received by Mr. George Miles, director and chief designer.

Engines on Show

WATFORD, Hertfordshire, is to hold its own industrial exhibition next month. It will be opened by Lord Brabazon of Tara on June 5th and will continue until the 18th. Several manufacturers familiar to *Flight's* readers will be represented, in particular the de Havilland Engine Co., Ltd., who will be showing Gipsy engines, and the Monaco Motor and Engineering Co., Ltd., who will exhibit their 100 h.p., flat four, light aero engine.

Fighters for Turkey

FIVE hundred British fighter aircraft consisting of Mosquitoes, Spitfires and Beaufighters will shortly be delivered to Turkey. British pilots will fly the aircraft out, accompanied by Dakotas, which will carry the pilots back to this country.

Target H.M.S. Hawkins

THE 30-year-old cruiser H.M.S. *Hawkins*, of 9,800 tons, will, it is believed, serve to the end as a target in the bombing trials (mentioned in *Flight* of April 10th) being carried out this month. The latest information is that Naval air squadrons will not be engaged in the trials as was expected, but that R.A.F. squadrons will be the attackers. Lancasters will probably be used to "deliver the goods."

Rocket Research

REPORTS from America state that the United States Navy has developed a new supersonic rocket capable of taking a useful load to a height of 235 miles. The models, named "*Neptune*," at an estimated cost of £21,000 each, are expected to be ready for testing next month. The power unit for the rocket weighs only 250 lb, but is stated to give an average speed of three times the speed of sound. Apparatus for transmitting data to the ground will be carried.

MY FAIREST CHILD: Miss F. Cooper, Assistant Director of the W.J.A.C., with F/S Hames in the cabin of the Fairchild newly acquired by the Women's Junior Air Corps.

Extraction

MR. JOHN HOMEWOOD, an Australian dentist, flies himself and his dental equipment on a regular tour of country towns in New South Wales which have no resident dentist. Using a Tiger Moth, he spends two weeks in each town, and as there are over fifty of them the number is well beyond his capacity to handle. He is endeavouring to secure additional practitioners to join him in his enterprising venture.

Bristol Visit

MR. BAHADHURSINH VIJAISINH, director of Ambica Airways, on his way back to India from America, is staying in England for a fortnight. Whilst in America he accepted the Indian sales agency for the Beechcraft Corporation. Mr. Vijaisinh believes that for a considerable time to come the bulk of the Indian internal traffic will be in passengers, and he is concentrating on small-capacity passenger aircraft. However, he expects to fly to Bristol during his stay here to see the Brabazon I. The Bristol Aeroplane Co. are placing an Oxford at his disposal.

News in Brief

IT is rumoured that during Russia's May Day fly-past in Moscow, a new Russian bomber similar to the American Superfortress was seen.

* * *

Two country houses have been acquired for B.E.A. Woolley Hall, near Maidenhead, bought for £13,000, is to be used as a rest house for mobile female staff, and "Larchmoor," Stoke Poges, is to accommodate offices of the Supplies branch of B.E.A. "Larchmoor" was purchased at a cost of £29,000.

* * *

The head office of the Northern Aluminium Co., Ltd., formerly situated at Banbury, and the London sales office, formerly at Bruton Street, have been combined at Wellington House, Lancaster Place, Strand, W.C.2.

* * *

Westland Aircraft, Ltd., announce that Mr. Boulger has been reappointed to the company as deputy planning officer, and Cdr. Bassett, R.N. (Rtd.), is now appointed commercial manager of Normalair.

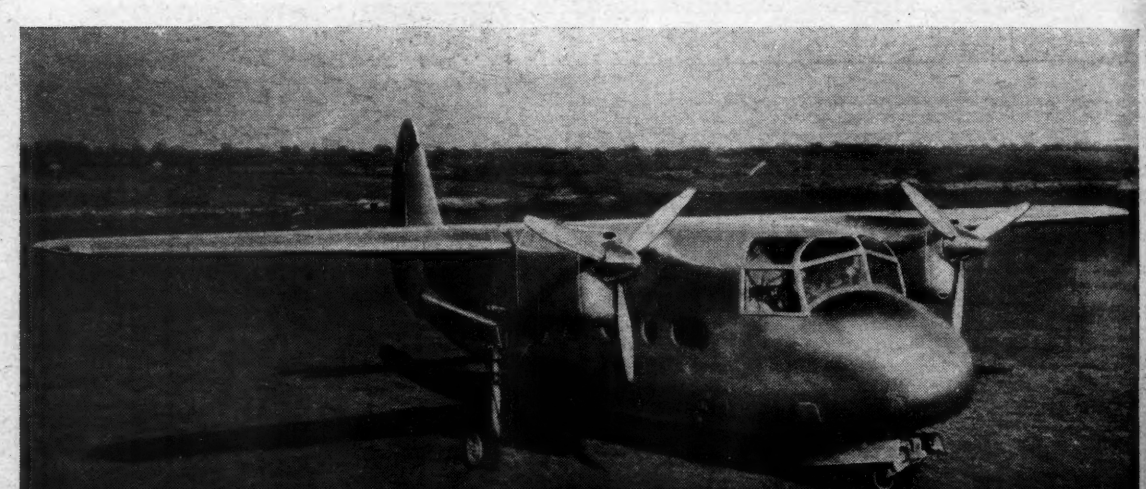
* * *

G/C. Cunningham recently covered the 1,312 km distance between London and Norrköping, in Central Sweden, in a Vampire jet aircraft in 1 hr 58 min. The Vampire's average speed was 659 km per hour, the highest reached in Europe on such a long flight. It is believed that this constitutes a new European speed record.

* * *

Starting on May 25th, the Pan American Airways are to introduce two flights weekly between Sydney and San Francisco, and the travelling time will be reduced from 72 hr to 46 hr by omitting overnight stops. Hitherto Pan American had only one flight weekly between San Francisco and Australia. Aircraft will leave Sydney on Sundays and Thursdays and arrive at Sydney on Saturdays and Wednesdays.

ON THE CUSTOMER'S DOORSTEP: Col. E. P. J. Ryan, O.B.E., Middle East representative of the S.B.A.C., in the Society's office at 570, Immobilia Buildings, Sharia Cherif Pasha, Cairo.



PERCIVAL MERGANSER

Details of the Layout, Construction and Equipment of Percival's 5/8-seater Twin : Flight Testing to Begin at Once

IN designing and building the Merganser, the Percival Aircraft Company have made a very practical approach to the problem of providing a good feeder-line aircraft. Two very important qualities were kept in mind when the aircraft was being designed: the passengers' comfort and the operator's pocket. Too often both these properties are sacrificed to high performance.

To achieve comfort and convenience for passengers a really large cabin is employed, with two good-sized entrance doors. For the same reason a high-wing and nose-wheel landing gear layout was selected.

For economy, a simple, light, all-metal construction is used. Two D.H. Gipsy Queen 51 engines are fitted, and by the use of wing components similar to those of the Prentice, tooling costs—particularly of rubber press tools—have been kept to a minimum.

Although the layout must result in a slightly higher structural weight and more complicated undercarriage folding, these disadvantages are easily outweighed by such conveniences as a level floor with very low loading line and front and rear doors; good view for passengers; room to stand upright in the aisle or to sit in real comfort; a shaded cabin with no dazzling reflections from the wings; and on the ground manœuvrability and good view for the pilot and less danger in the event of a belly landing.

Those responsible for the design shrewdly point out that passengers disembarked from a spacious airliner are likely to be very sensitive about restriction of space when re-embarking on a small feeder-line aircraft. On the Merganser their feelings have been considered and, in effect, an eight-passenger section of the fuselage of a much larger aircraft has been removed, and a smaller aircraft built round it. Dimensions are given in the data table.

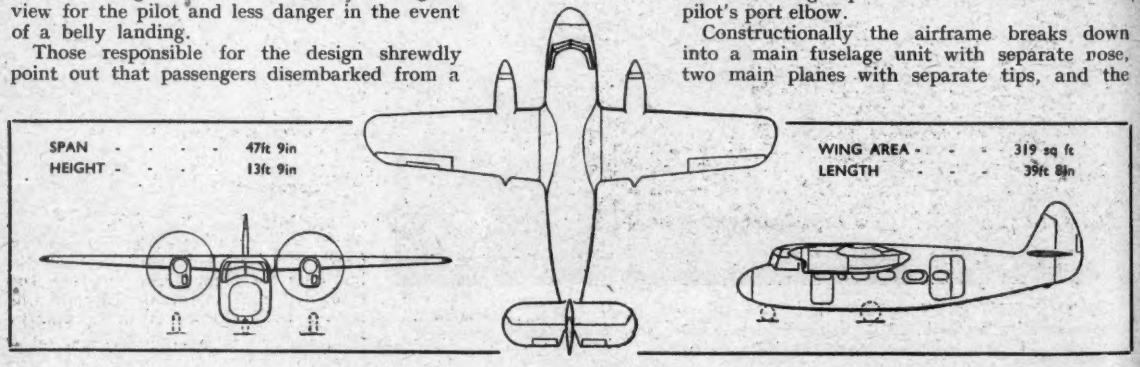
Interior Layout

Alternative cabin arrangements provide for five, six, or, for short-range work, eight seats, and a toilet opposite the rear entrance. The five- and six-seater versions have a separate luggage compartment between the cabin and the cockpit into which opens the front door. It is necessary to stoop to enter the cabin by either door but anyone of average size can stand upright when once inside.

Control runs are carried in a duct in the roof, and this gives the incidental advantage, should Mergansers be used by the Air Survey Company of the Hunting Group, that ports for cameras can be cut almost anywhere in the floor.

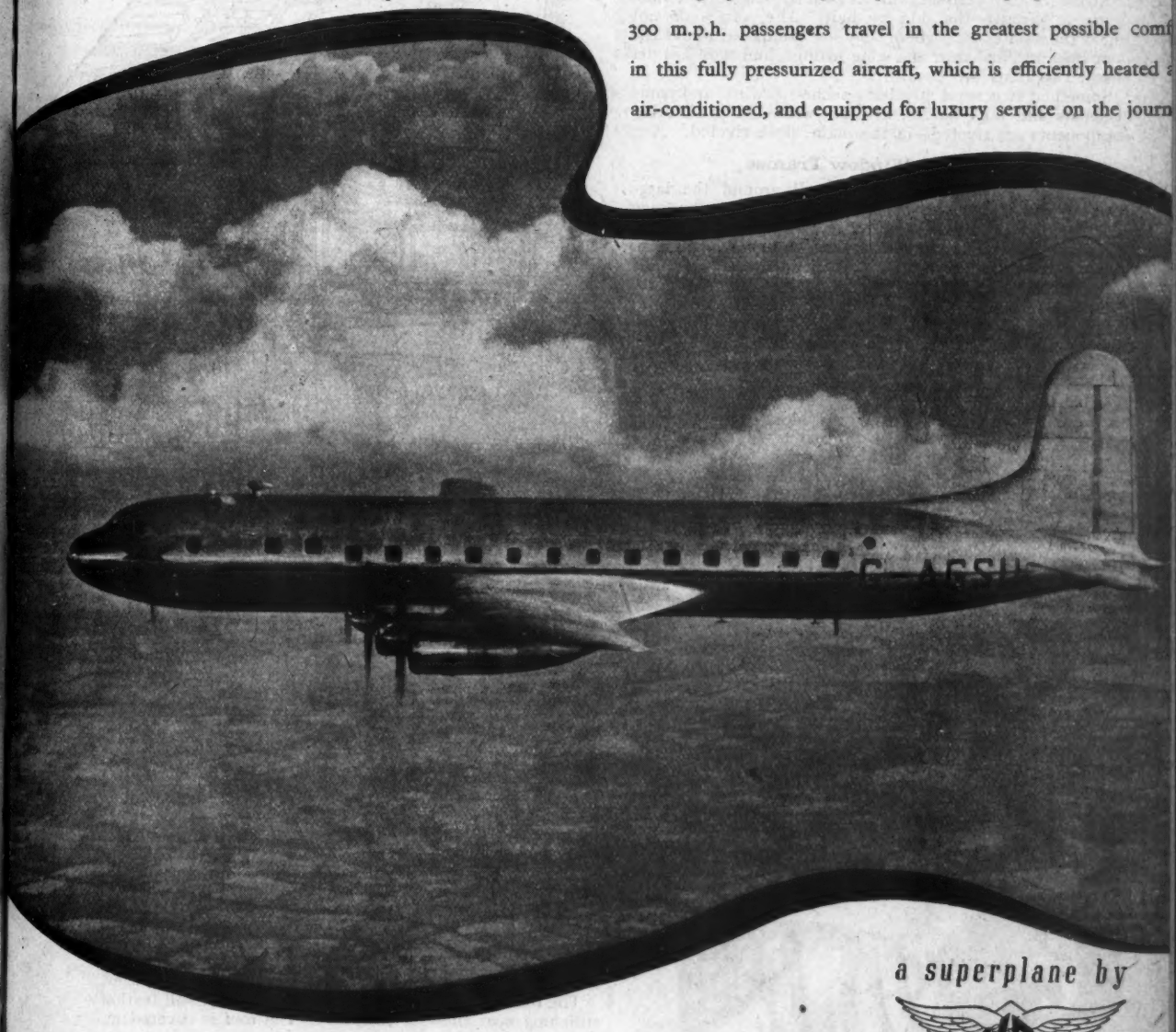
The cockpit is spacious and well arranged, and the outlook is particularly good. Dual push-pull wheel controls are fitted, levers are positioned on a central pedestal and electrics are grouped on a box below the 1st pilot's port elbow.

Constructionally the airframe breaks down into a main fuselage unit with separate nose, two main planes with separate tips, and the



Pressurized for luxurious travel

Latest of a long line of successful aircraft, the Tudor II is a worthy upholder of the Avro tradit of service on the airways of the world. The fuselage accommodation of the Tudor II varies to m particular operators' requirements—from 60 seats down to 40—according to the range and lay decided upon. With an economical cruising speed of 235 m.p.h. and a top speed of well o 300 m.p.h. passengers travel in the greatest possible comf in this fully pressurized aircraft, which is efficiently heated a air-conditioned, and equipped for luxury service on the journ



a superplane by

AVRO

THE AVRO TUDOR II

Four Rolls-Royce Merlin Engines

A. V. ROE & CO. LTD., MANCHESTER (Branch of Hawker Siddeley Aircraft Co., Ltd.)

usual tail and control surfaces. There is no centre section as such, and the tail portion of the fuselage, detachable from the rear door aft on the prototype, will not be so on production machines.

The wings are attached to two large machined forgings which are part of the main fuselage formers, and sit like yokes on the top or back of the cabin. The forgings are of elongated I section, and they extend down each side of the cabin walls. Monocoque construction is employed, and the frames and stringers are light-alloy Z and top-hat section respectively. The stringers are reversed by comparison with the early designs, that is with "brim" riveted to stringers and "crown" to skin, thus reducing the lines of rivets through the skin by half. The frames do not touch the skin except where they are reinforced round the door openings and near the wing fittings, and here heavier channel sections are used.

Some non-structural members, such as cowling and panel stiffeners and tank baffles, are spot-welded, but all other components are riveted—in the main, flush riveted.

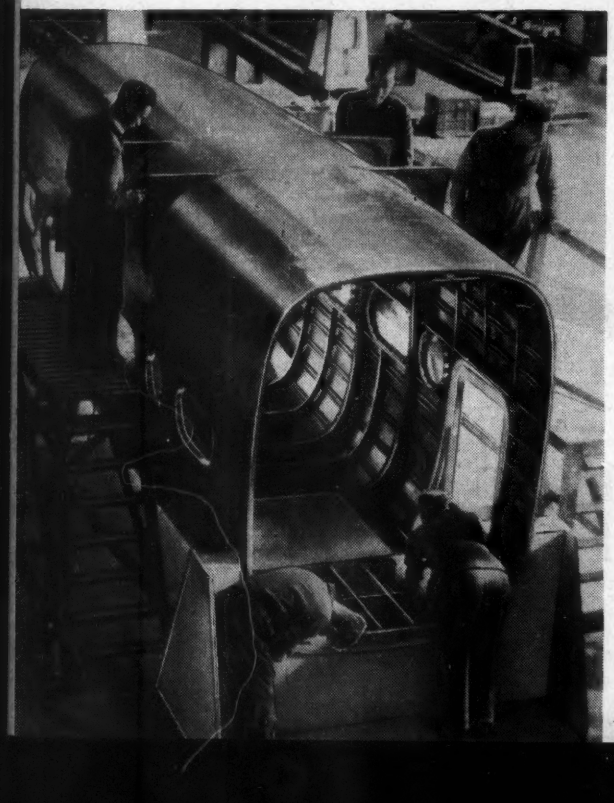
Door and Window Frames

Reinforcement of the fuselage shell around the large door apertures takes the form of an inner skin on each side and opposite to the door. In addition, the frame is a stiff channel section, and other lengthwise channel sections above and below the door stretch rearwards and gradually taper off. This feature is not, of course, found on the prototype which, as already mentioned, has a detachable tail section. The fuselage shell is also reinforced by channel sections stretching fore and aft above and below the windows, and an inner skin is provided around the window openings.

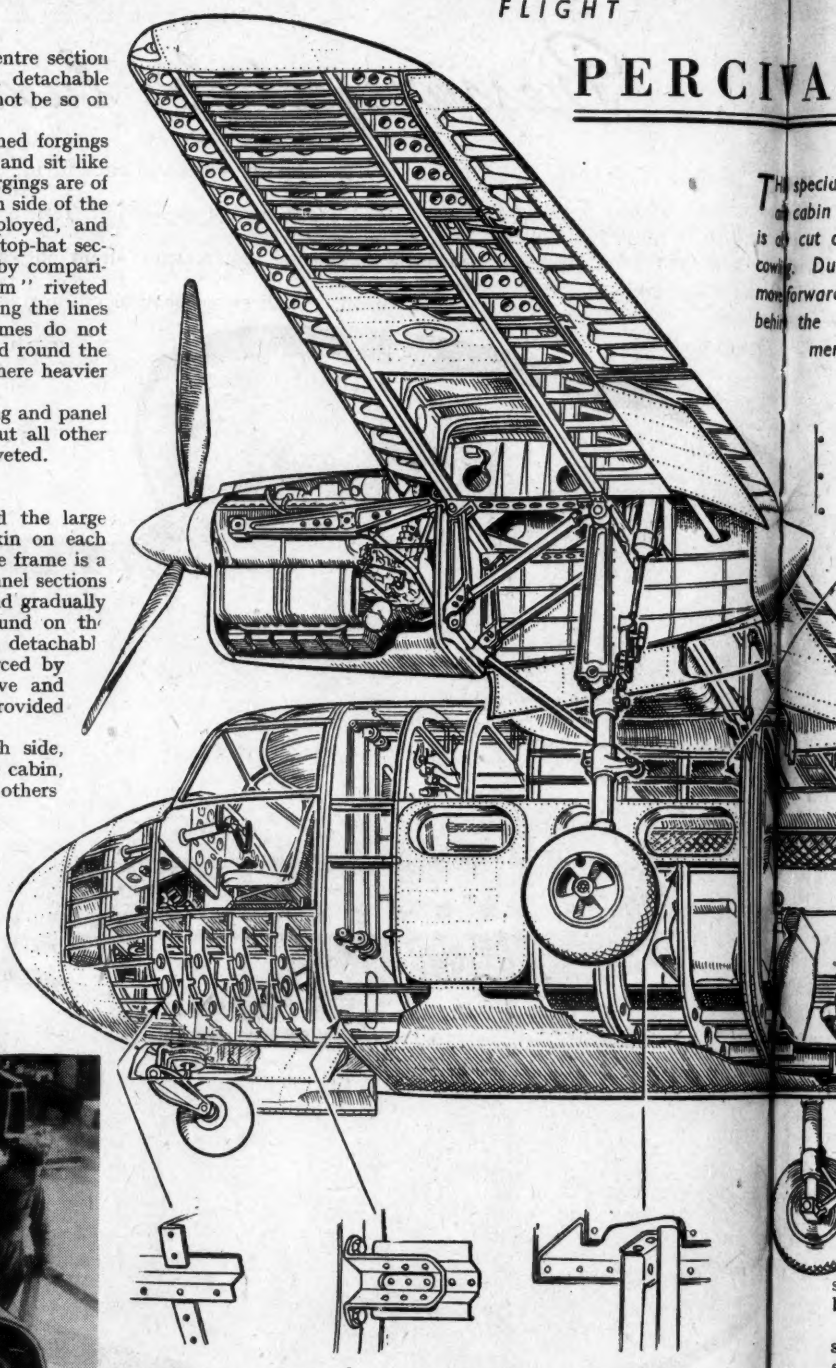
Large emergency push-out panels, one each side, are provided approximately midway along the cabin, and these contain windows to match the others. An emergency roof exit hatch is neither considered necessary (with two large doors and two side escape hatches) nor very practical for the passengers. The floating level in the event of ditching, assuming no shell damage, has been calculated as approximately 1ft below the windows, with full load and one wing tip in the water.

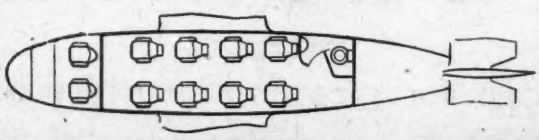
The fuselage floor is reinforced and will need still further stiffening near the rear entrance. The roof is covered in, and access to the control cables, wiring, etc., is gained through detachable inspection panels. A single large flap jack is situated in the roof on the aircraft centre line, and three air bottles are placed near by, above the luggage compartment. The rear wall for the cabin is of sandwich construction, a plastic centre being faced with metal skins.

In order to prevent accidental damage to the tail units on a tail-down landing, a small unsprung tail wheel protrudes



The cabin section of the prototype fuselage under construction. Cabin height and width can be judged by the comparative size of the workmen.



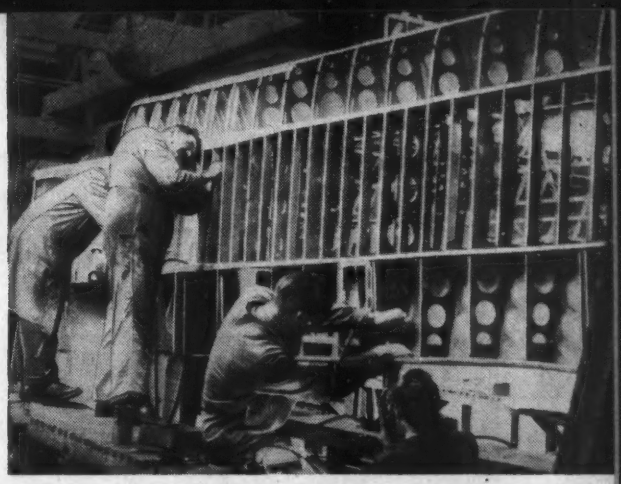


PERCIVA

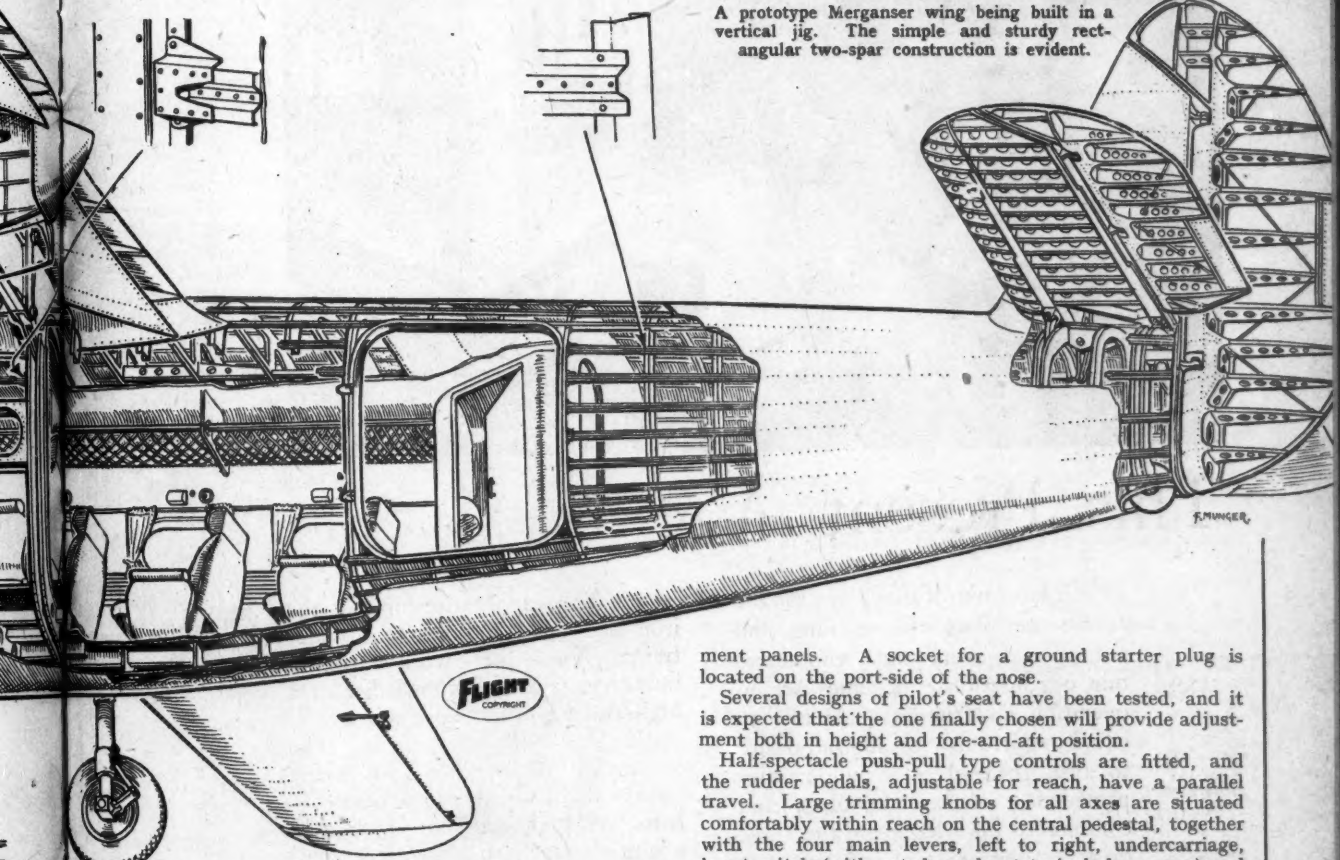
This specia... a cabin ... is a cut ... cowling. Du... mon forward ... behind the ... mer...

CIVAL MERGANSER

THIS special "Flight" copyright sketch shows the construction and cabin layout of the Merganser. The engine installation is also cut open to show the simple mounting and the tight cowling. During retraction, the main undercarriage wheels move forwards and upwards, finally tucking in immediately behind the engine bulkheads. Alternative seating arrangements are shown at the foot of the pages.



A prototype Merganser wing being built in a vertical jig. The simple and sturdy rectangular two-spar construction is evident.



slightly below the fuselage at the rear end. It is mounted between two short back-to-back channel members.

Forward of the passenger cabin, except in the eight-seater version, is found the luggage compartment and ahead, separated by a bulkhead, the cockpit. The high floor of the cockpit is necessary to give room for stowage of the nose wheel, and the considerable reinforcement of the nose structure to support the nose wheel may be seen through the hinged nose fairing. The nose-wheel fittings are carried on two sturdy fore-and-aft beams stretching from the cockpit rear bulkhead to the main nose frame member. A large centrally-mounted forging takes all drag loads from the wheel via the jack leg.

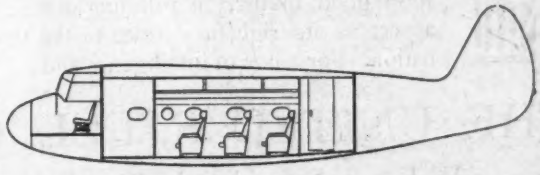
Two compact new-pattern Exide accumulators are carried very conveniently in the nose, and access is also given to the flying controls and the back of the instrument panels. A socket for a ground starter plug is located on the port-side of the nose.

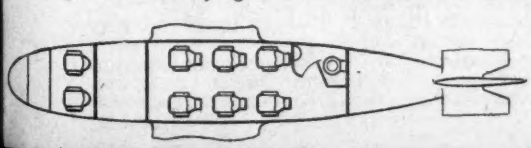
Several designs of pilot's seat have been tested, and it is expected that the one finally chosen will provide adjustment both in height and fore-and-aft position.

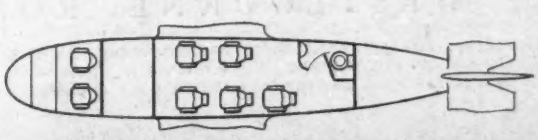
Half-spectacle push-pull type controls are fitted, and the rudder pedals, adjustable for reach, have a parallel travel. Large trimming knobs for all axes are situated comfortably within reach on the central pedestal, together with the four main levers, left to right, undercarriage, boost, pitch (with gated quadrant to include reverse) and flaps. Fuel cocks are on the bulkhead behind the pilots' heads.

The vee windscreen is wide and deep, and lies approximately 16 inches in front of the pilot's face. The front panels of the roof are also transparent, and the whole screen structure has a cast light-metal framework.

Like the Prentice, the prototype Merganser has a







This Present Age . . 5

In the forefront of our plans for the future we place the training and education of every youth who enters our organisation. Schemes are in operation and there is already an equal opportunity for all who desire to avail themselves of the facilities provided. Science, technology and commercial knowledge are the three great requirements of industry. It will be our privilege to ensure that these aims are rightly and efficiently fostered within the framework of the national educational policy. By the pooling of knowledge for the common good, industry is fulfilling one aspect of its rightful service to the nation. For a boy of intelligence and imagination, apprenticeship to the iron and steel industries provides training for a life's work requiring initiative, technical knowledge of a high order and the ability to understand one's fellow men. The successful organisation of many thousands of workers presents problems of understanding in human affairs equal to the technical problems of economic production. Industry is a major part of our social life as well as the means of national wealth, therefore the discipline of education provides the means for developing those talents with which each one is endowed, and ultimately enriching the inheritance of the country whose citizens we are.

THE UNITED STEEL COMPANIES LTD

THE UNITED STEEL COMPANIES LIMITED

17, WESTBOURNE ROAD . SHEFFIELD 10

STEEL, PEECH & TOZER, SHEFFIELD
SAMUEL FOX & CO. LTD., SHEFFIELD
UNITED STRIP & BAR MILLS, SHEFFIELD

APPLEBY-FRODINGHAM STEEL CO. LTD., SCUNTHORPE
WORKINGTON IRON & STEEL CO., WORKINGTON
UNITED COKE & CHEMICALS CO. LTD., CUMBERLAND

THE ROTHERVALE COLLIERIES, TREETON
THE SHEFFIELD COAL CO. LTD., TREETON
THOS. BUTLIN & CO., WELLINGBOROUGH

℞ U.S.P.37

PERCIVAL MERGANSER

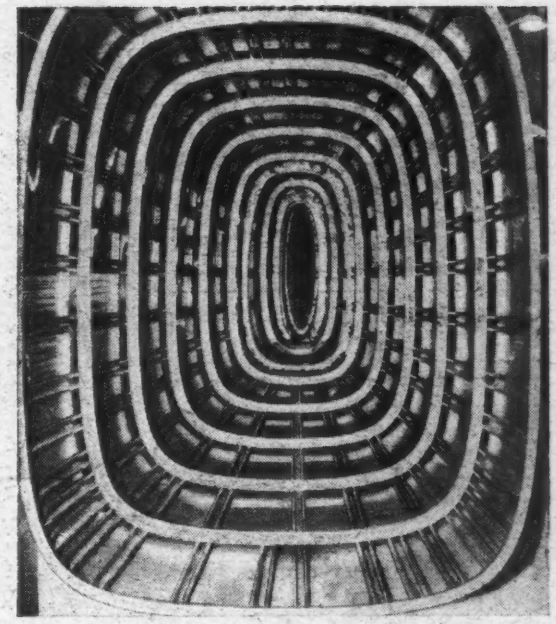
simple two-spar, multi-rib wing, the spar booms each being made up of two L-section extrusions bolted back-to-back on to a reinforced plate web. Towards the wing tips the rear L sections of each boom taper off and finally run out.

At the roots the front and rear wing spars are reinforced and, as explained, attach at four points to two large one-piece forgings which form the main cabin frames down to shoulder height. A light alloy with high zinc content, D.T.D.683, is to be used for these forgings, but on the prototype they are L.40. Large fairings cover the wing joints and attachment fittings on the upper side and extend over the top of the fuselage.

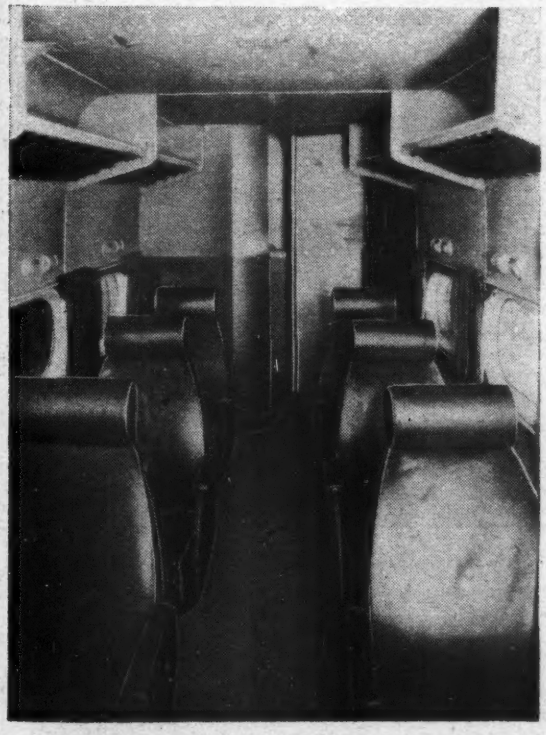
Leading and trailing edges are made up as separate units, and attached to their respective spars. The ribs are pressed and in many cases are interchangeable with Prentice components.

The sheet skin has chordwise stiffeners between the contour ribs, and is attached mainly by flush riveting. For the engine bay the ribs are diagonally braced from the spars in the horizontal plane and have double webs reinforced with corner plates and brackets. There are also lightening holes in the webs. The shroud round the leading edge of the ailerons is a stiff, false spar member which carries three sealed ball-bearing aileron hinges. The aileron itself has lightened pressed ribs and a single light-alloy channel spar forming a D with the nose skin, but like all the control surfaces it is otherwise fabric covered. The port aileron carries a trimming tab operated from the cockpit through a screw jack. Wing tips are small separate units in which are carried the navigation lights.

Later production Merganser, like the larger P.50s, will probably have a re-designed single-spar wing with a reduced number of ribs. The skin will be of slightly heavier gauge and spanwise stringers will be introduced, but the shape will remain substantially the same. Such a structure would be lighter and more efficient but had it been specified for the prototype would have caused delays in the design stages.



Looking down the rear portion of the fuselage one sees the change from a large, almost square section to the deep, narrow tail. Only the prototype has a detachable tail unit, but the simple construction which is so apparent will be maintained in production.



The interior planning of the Merganser was first shown to the public at the Paris Exhibition. The above illustration shows clearly the spaciousness and, in particular, the high ceiling of the passenger compartment. Alternative layouts are illustrated on pages (a) and (b).

As already mentioned, a single pneumatic ram operates the split trailing-edge flaps. They are divided into four sections, one inboard of the engine nacelle, and one outboard on each side. The torque tubes of the flaps pass from the cabin roof through the engine nacelles. The flaps have upper as well as lower skins riveted to channel-section leading edges and Z-section ribs.

Forward of the four flap sections, between the spars, are carried four crash-proof fuel tanks with a total capacity of 105 gallons. Detachable underside panels give access. Remaining features of the wing units are the built-in T.K.S. liquid de-icing equipment, and on the port side, a retractable landing lamp.

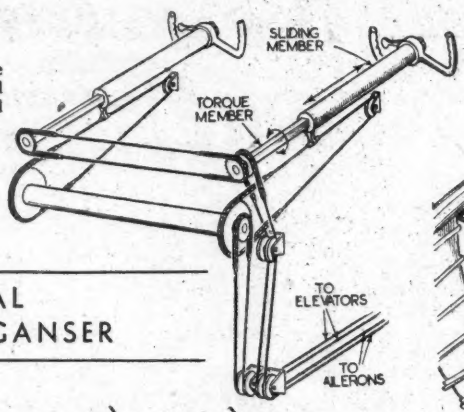
Similar in construction to the main planes, the tailplane and fin carry fabric-covered control surfaces on sealed ball bearing hinges. Also like the wing the tailplane is flush riveted over the drag area. It is attached by three bolts, two to the front spar and one to the rear, and diagonal bracing stretches between the ribs and fittings. Liquid de-icing is provided for the leading edges.

The fin spar is bolted to the stern post, and its nose frame member is attached to the tailplane front spar. Screw-operated trimming tabs are fitted to both elevators and rudder, and mass balances are carried inside the horn balances.

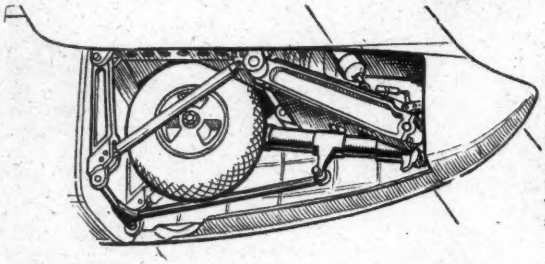
Gipsy Queen Mounting

The very neat built-up engine mounting is similar in appearance to some German in-line mountings. Two large forgings extend horizontally from the upper part of the bulkhead, and tubular compression struts brace this structure from the lower attachment points on the bulkhead. The port side members have had to be slightly cranked and an extra small strut added to accommodate

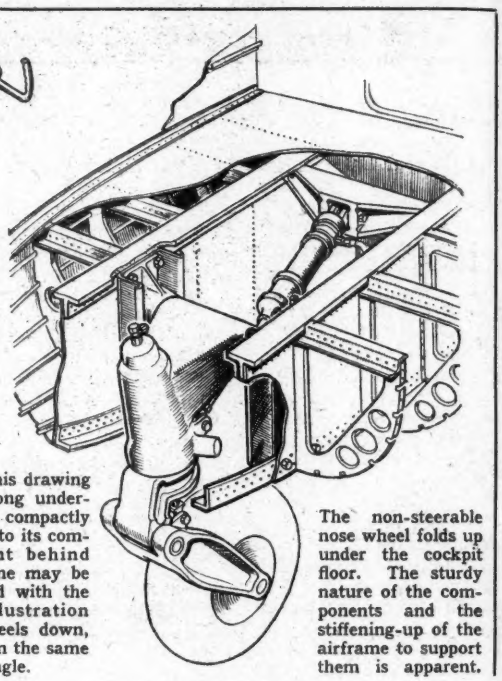
(Right) Details of the operation of the dual push-pull control wheels.



PERCIVAL MERGANSER



(Left) This drawing of the long undercarriage compactly folded into its compartment behind the engine may be compared with the main illustration with wheels down, seen from the same angle.



The non-steerable nose wheel folds up under the cockpit floor. The sturdy nature of the components and the stiffening-up of the airframe to support them is apparent.

controls on the Gipsy Queen 51s. The main machined forgings, to which are attached the engine mountings, are placed on the rear side of the bulkhead, and they carry, in addition, lugs for the undercarriage members.

Complete accessibility is given to the tightly cowled engines by detachable panels, and the unit is designed for quick removal complete with its oil tank and cooler. Reversible-pitch constant-speed D.H. airscrews are fitted, and provision is made for blade de-icing.

On high-wing machines the main undercarriage legs are apt to become unwieldy, but the Messier (Electro Hydraulic Ltd.) design for the Merganser tucks away very well and is very neat in the extended position. The three wheels are retracted pneumatically and the main pair are each carried on a single oleo-pneumatic leg. Of the three air bottles in the roof of the luggage compartment, two are for normal service and one for emergency use. The nose wheel, non-steerable but free to swivel, folds rearwards, and the main wheels fold forwards then upwards. In both cases the doors are mechanically closed over the wheels.

Undercarriage Fittings

Fittings for the legs are attached directly to the rear main spar, and when down, the legs are vertical. A drag, strut hinged a little below the folding point of the leg, extends forward to a cross member picking up on lugs on the lower ends of the engine mounting brackets.

On the prototype, the main undercarriage legs are attached to large one-piece H-form castings, but on production machines some ingenious design development will enable a great deal of expense and time to be saved. Although all four uprights of the two H castings differ, one channel forging can be used as the basis of each, and a pair when machined can be built up with a front and a rear plate to replace the casting. This built-up unit is shown in the main drawing. The tail portions of the engine nacelles are small separate units while the centre sections, housing the wheels, are of good stiff construction based on channel and 2-section stringers and Z frames.

A full complement of instruments, including a complete blind-flying panel, is fitted to the Merganser, and provision is made for an automatic pilot, Decca navigator, and radio equipment up to 100 lb in weight. Windscreen wipers may also be fitted. Other equipment worthy of special mention includes fluorescent cockpit lighting, a taxying light in the nose, cabin heating by combustion heater, and the provision of an A.S.I., altimeter and clock on the front cabin bulkhead for the benefit of passengers.

The announcement of the delay in production of Mergansers because delivery of Gipsy Queen 51 engines has fallen behind schedule, is disappointing. However, this will mean that work can proceed faster with the larger capacity model P.50 which is similar in layout and is powered with Alvis Leonides engines. In the meantime the prototype Merganser will be thoroughly flight-tested, and upon resumption of work, production should proceed without interruption for modifications. In view of the similarity of the Merganser and P50 Prince, flight testing of the Merganser, which has now started, will supply a good deal of aerodynamic and constructional data for the slightly larger machine as well.

The table of alternative loadings and ranges shows that from basic figures of 5 passengers + 300 lb luggage + 1 crew for 800 miles range, the addition of each passenger or crew member would reduce the range by 200 miles. With 8 passengers and 1 crew 300 miles range is still possible with 200 lb of luggage, or 500 miles without luggage. A useful arrangement would be 7 passengers, pilot, 300 lb luggage and 400 miles range. Freight alone can be carried up to 1,350 lb for 800 miles or 1,825 lb for 300 miles.

PERCIVAL MERGANSER DATA
(de Havilland 296 h.p. Gipsy Queen 51)

All-up weight	6,700 lb
Disposable load	2,110 lb
Wing loading	21 lb/sq ft
Power loading	11.35 lb/h.p.
Speeds :	
Max. at S.L.	180 m.p.h.
Max. at 5,000ft	193 m.p.h.
Max. cont. cruising at 5,000ft	183 m.p.h.
Max. econ. cruising at S.L.	150 m.p.h.
Max. econ. cruising at 5,000ft	160 m.p.h.
Max. econ. cruising at 8,000ft	167 m.p.h.
Stalling (flaps down)	69 m.p.h.
Climb at S.L.	1,010ft/min
,, 5,000ft	1,100ft/min
Service ceiling (approx.)	24,000ft
Duration at 5,000ft	5 hours
Range	800 miles
Take-off run to clear 50ft, still air, S.L.	560 yd

American Newsletter

Condition of Aircraft Industry : Airline Seats Available : Seasonal Traffic Effects : Manufacturers and Operators in the "Red"

By "KIBITZER"

THE American aircraft industry has been, and still is, rather sick and sorry for itself. Sick, that is, if you compare its present condition to its rude and rather adolescent health during the war years. But, and this is an important but, it is not nearly as sick as its enemies hope, or its relatives, and sometimes even itself, thinks. Perhaps it is more surprised than sick. For its hurts are partially self-inflicted and due to that well-known combination of over-optimism and poor planning—a combination that is not unusual here. The Americans—probably luckily for us all—seldom dream in penny numbers. Consequently if things do go wrong, they go wrong in a big way. Even then, however, it is important to realize that their vast natural resources, their money and imagination give them tremendous powers of recovery. If a few people go to the wall in one "recession" there are plenty of others who will take their place. (The use of the word "recession" is fashionable just now, and much preferred to "slump," the latter having a slightly bitter 1929 flavour!)

So, bearing in mind their latent strength I would say that the present "recession" (which has taken the unpleasant form of a falling-off of profits, a sharp dip in orders, a decline in traffic receipts and even the cancellation of orders for medium and large transports) is not too serious a thing and is now at about its lowest point. (Unless, of course, the whole country is caught up in an economic failure of a national, or international, nature.) By saying that I do not consider the situation serious I don't suggest that there will be any sudden and immediate revival of all classes of aviation business. I think rather that from now on, perhaps for two years, there will be a period of readjustment and slow recovery of normal, as opposed to unnatural-wartime, growth. This will start with airlines and then will spread throughout the industry. Unfortunately the year 1948-1949 is likely to be a difficult one for those manufacturers who are building the larger types of transports. For by then their present orders will have been fulfilled and new ones will be increasingly hard to get. By that time too, air traffic requirements should have found their level in regard to size of aircraft, numbers required, and performance. Moreover the number of seats that can be filled will have been established. In this latter regard there were some 24,000 seats available in 1945, but it is estimated that these will have increased to 40,000 by 1948. These, combined with faster aircraft, may well take care of the travelling public. Furthermore the faster schedules, and probably the routes themselves, will by that time have been revised to take care of changed conditions. These facts, combined with less exaggerated thinking, and a probable shortage of ready money due to an almost certain recession in other industries, will probably have the effect of reducing still further the orders for large transports. This will mean that some form of subsidy will almost certainly be introduced in order to keep the manufacturing firms up to the required production standard.

Airlines and War

If this seems an optimistic statement at a time when a Republican-dominated government is doing its best to cut down expenditures so that it can meet its election promises, it must be remembered that the armed services are vitally interested in the number of transports available. During the last war they commandeered a large percentage of the domestic airlines' aircraft and personnel, and they will certainly want to do so again. They are, therefore, hardly likely to let this important source of wartime supply fall below that required. Thus, whatever government is returned to office in 1948, they cannot afford to let the aircraft manufacturers' output, whatever types they build, fall below a certain figure. What the limit will be, none can say, but if present trends are any indication, that limit will be in direct relationship to the country's belief in the imminence of war. In any case, to-day's swing may not last and, in the future, military orders for transports are almost certain to be given in larger quantities than is the case now. If this does not happen before the 1948 elections, it will do so afterwards.

But all this is, up to a point, crystal gazing, a pastime difficult enough with the aircraft industry of any country, but nearly impossible over here, and it would be more instructive to try to find the causes of this present relapse and to examine the present condition of the patient rather than say how his convalescence will be handled. Even if such causes are, by their very nature, impossible to the British industry, maybe a proper understanding of how they arose, and what they have done to business here as of to-day, will be useful to anyone who is interested in aviation development in the United States—and that should mean anyone who is in the aircraft trade anywhere!

Reasons for Recession

Four sections of the American Aircraft Industry were hardest hit, and these sections were interconnected with one another, two and two: the manufacturers of air transports and the airline operator; the light plane manufacturer and his distributor (or agent), who in many cases is also an airfield operator.

To take the air transport case first. During the war, conditions throughout the States gave an entirely false value to some sections of the air transport picture. Machines were in very short supply, due to the armed services having taken over both the actual aircraft from the operators and the manufacturers' output. Furthermore, there was a very large travelling public who were always in a hurry to get somewhere else. Rail traffic was, certainly for the civilian, difficult and uncomfortable. Consequently the airlines ran at 100 per cent loads, even under the priority system, and it wasn't long before their service deteriorated too, as any service does without competition. From this everyone seemed to get the idea that such conditions could continue into the post-war years, and as soon as the V-days came along bigger and better aircraft types were ordered and delivered, and large numbers of ex-army and navy C-54s were converted in anticipation of this demand. In the autumn of 1946 there were enough seats to go round and everything looked lovely. Suddenly the public, as it always does in the winter, found it didn't like flying in bad weather as much as it thought it did. An unfortunate series of storms also played havoc with the new schedules (the airports could not take care of the faster types and became overcrowded both with aircraft and would-be passengers), bookings were unbelievably difficult and everything became most uncomfortable. The public then said, in effect, "to hell with it . . . ." There was nothing so very odd in this, for the seasonal traffic returns show that there has been a similar drop every normal year since the airlines started. Unfortunately right on top of this situation there came first a fortnight of ghastly weather and then a crop of fatal accidents (not all to American operators, let it be said). At the same

AMERICAN NEWSLETTER

moment some of the national magazines with large circulations started what was almost a hysterical campaign against the airlines, accusing them of every inefficiency under the sun; and before anyone knew what was happening everyone had joined in a mass movement of condemnation.

The net result of all this was to drop airline receipts to below normal. This condition was magnified by the fact that although the actual numbers of the travelling public had really not shown much more than a seasonal decline, the number of available seats and the frequencies and speed of the schedules had been increased, so that every airline was operating with half-empty machines, or worse, and their revenues dropped accordingly. It soon became obvious that they would probably show a loss for 1946, and this again meant that orders for large aircraft to carry the hoped-for, but now doubtful, 1947 passenger traffic would have to be cancelled. Practically every manufacturer suffered as a result of this decision. They in their turn realized that the combined cancellation of such orders, and the doubtful status of military requirements under the Republican financial programme, would probably put them into the red, if not in 1946, certainly in 1947. From then on the trouble started.

It is an unfortunate fact that those same qualities which enable this country to tackle vast projects and to surmount great difficulties in their fulfilment, also result in equally violent flights of imagination in a negative direction. When this occurs almost anything can happen. The financial interests in Wall Street were—and are—acutely nervous of any trend that might foretell another slump, so that as soon as the airline receipts dropped a minor panic arose and the somewhat inflated stock exchange prices of aviation shares followed suit. Nothing more was needed to set the cycle in motion, and before anyone knew exactly what was happening the industry went into a steady—but luckily not stable—mental and economic spin!

By the end of February, 1947, the 1946 annual reports began to be published. Of the larger manufacturers Douglas, Lockheed and Boeing all showed losses, but Glenn Martin and Grumman showed a profit. The combined engine and aircraft business of United Aircraft also showed up in the black, but even in these few cases the figures looked awfully small when compared with those of the war years. Of the major airlines, Eastern, United and Braniff showed a profit. But American, Western, P.C.A. and T.W.A. showed a loss, the latter for the fat sum of 14,347,836 dollars. This then was the depressing position at the beginning of March, 1947, and it was hardly improved by a speech of General Echols, late of the U.S.A.A.F. and now President of the Aircraft Industries Association . . . . "Aircraft production," he said, "was worse in 1946 than in peacetime 1939. . . . The transport market, except for a backlog of 868 now on order, appears to have reached the saturation point. Our export market has been wiped out by the sale of 1,845 surplus military aircraft to foreign countries. There is at present no indication of any increase in the production market of military aircraft—if anything, a further reduction—and the 1948 picture looks extremely black. Of the twelve manufacturers of heavy aircraft in the U.S., eight operated 'in the red' last year. With nothing more than we can now foresee to sustain them, others will go into 'the red' this year, and the aircraft industry will have rotted. . . ."

Remarks like these were hardly likely to cheer up an industry which almost thought itself dying, and everyone's face grew longer. (Quite what some of them would feel if they were faced with the size of orders and difficulty of manufacture at present ruling in England one trembles to think!)

But luckily, and as was quite obvious to many who gave it serious thought, things were not as bad as all that. By the beginning of April, airline bookings had begun to recover, some of the orders for large aircraft previously cancelled were reinstated, and it appeared that even if there was a hard road ahead, it wouldn't end in an abyss. By the end of April airline bookings were back to normal and "waiting lists" were the order of the day. Maybe the patient wasn't dying after all!

Personally I, in company with many others here, believe that there are plenty of signs to justify optimism. It will be necessary to readjust things to suit post-war conditions. Success or failure must not always be judged entirely on the amount of profit at the end of the year, and certainly not by the standards of war-time profit. Aviation is unfortunately still a long-term investment. Certainly it is the "Coming Thing," but unfortunately it is still coming. We must realize that we are still pioneering, but pioneering without the glamour of the oil-stained helmet and the smelly leather jacket. Anyone who doesn't realize that or doesn't want that kind of a life, with its inevitable ups and downs, dangers and tremendous achievements, had better quit now. Some of us may live to grow old and venerable in the industry. Some of us will not. But the aircraft trade is as yet no place for those whose one idea is an easy and ever-increasing profit in the shape of hard cash. It may take "recessions" to bring that fact home.

Naval Aircraft. (The Discussions)

(*Continued from page* 469.)

and greater fuel load contributed. He advocated the use of helicopters for air-sea rescue work and ship-to-ship communication. They had already been used, he said, for radar and gunnery calibration.

Mr. Martin, in referring to physiological aspects, emphasized that it was the rate of change of acceleration which was important. Arrester gear designed for high-speed entry was not amenable to exact calculation.

Mr. Scott Hall questioned whether it was equipment which limited Naval aircraft, and suggested that it was rather the limitations imposed by carrier operation. He thought that perhaps the meeting mentioned by Sir Charles Lillicrap was overdue. Concerning armament, he said that the design of the aircraft must be considered from the outset with this in mind.

Captain Luby stressed the need for economical power plants, and mentioned that the Perseus, Taurus, Centaurus,, Eagle and special Griffons and Merlins had been developed to Naval requirements. About 60 per cent of the "prop-jets" under development were for the Navy. Capt. Luby referred to the possibilities of declutching turbines to reduce fuel consumption. He listed reliability, economy, power and weight as the requirements for Naval power units, in order of importance.

Mr. Mitchell asked for the weight of the moving parts in catapults to be reduced, and advocated "mating of the aircraft with the catapult."

Dr. Roxbee Cox referred Mr. Boddington to investigations of flying into balloon cables. He thought that these might facilitate the solution of some problems of wave transmission in arrester cables.

ATLANTIC MET. STATIONS

AS announced in *Flight* of April 10th. the British plan for the operation of two Atlantic weather stations is to employ four ex-Naval corvettes of the "Flower" class. Conversion of the ships is going ahead, and special accommodation is being made to house the crew of twelve officers, twenty petty officers and twenty-two ratings to the standards laid down by the Ministry of Transport. Food when at sea will be good, and generous shore leave will be granted. A steel shelter is being erected on the deck for the filling of radio-sonde balloons.

There are many difficulties which have to be overcome, especially in connection with the methods to be used for obtaining accurate readings of temperature, pressure, humidity, and wind velocity. Each vessel will have six meteorological officers on board to keep a constant watch upon weather conditions and to make frequent forecasts. When on station the ships will, as far as possible, remain "hove to" more or less head on to the wind and sea. The necessity of accurate navigation to ensure remaining in the vicinity of their station is obvious, but the ships will make way through the water and vary position from time to time.

Readings of the upper air will depend almost entirely upon balloons carrying a radio-sonde and a radar reflector. The radio-sonde meteorological stations at present operating in the United Kingdom are at Penzance, Larkhill, Downham Market, Fazakerley, Leuchars, Stornoway, Lerwick, Aldergrove, and Valencia.

I.C.A.O. Affiliated to United Nations : Pakenham Committee Report

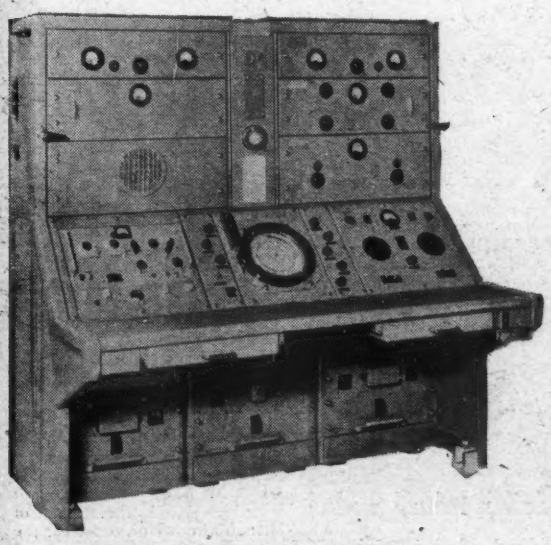
CIVIL AVIATION NEWS

FLIGHT TRIALS. The second prototype Marathon in flight. Whereas the first prototype had three fins and rudders this aircraft has only two.

TELECOMMUNICATIONS AT LONDON AIRPORT

THE Ministry of Civil Aviation claims that London Airport already has the best telecommunication system in the world. Those services already installed are being extended and improved with modern equipment and the following is an account of the present situation there and what might be expected in the immediate future.

For dealing with routine signals traffic and meteorological information, pneumatic tube message conveyors have been installed between the traffic office and the principal M.C.A. offices. This system will probably be extended to the offices of the airline companies in due course, but it is unlikely to be done until the permanent buildings are erected. Eighteen teleprinters are in use at present to provide two-way communication with Birdlip, Northolt, Croydon and Shannon, and one-way connections with Prestwick, Cable and Wireless, the Central Telegraph Office in London, and the airline operating companies' offices at the airport. Outgoing messages average 1,000 each day, the majority of them having at least three addresses. Practically all the messages intended for Europe, however, pass through Northolt, which has direct teleprinter connection with the principal Continental centres.



AUTOMATIC DIRECTION FINDER. The Standard Radio Type P.V.1-B two-channel V.H.F. Cathode-Ray Direction Finder as installed at London Airport. The screen can be seen in the centre of the lower panel.

For air-to-ground communication, London Airport is equipped with receiving and D.F. apparatus and two TR1196 transmitter-receivers working on 5,100 Kc/s for local control. The usual M.F., H.F. and V.H.F. R/T. communications systems are installed, and M.F., H.F. and V.H.F. D/F. facilities are available. It is noteworthy that about 20 to 25 aircraft ask for M.F. (345-348 Kcs) bearings every day, which suggests that old customs die hard. Monitor receivers are installed and are continuously manned on all the air-to-ground communication frequencies. A team of operators is always standing by to transmit urgent messages by hand in the event of a teleprinter breakdown.

The meteorological section supplies forecasts three times in each hour. A sub-regional forecast is broadcast at the hour on 8,515 Kcs, 3,961 Kcs and 279 Kcs, and, at half-hourly intervals, two abbreviated versions are broadcast on 279 Kcs, all by W/T. There are 16 transmitters, some of which are R.A.F. type T1131 and T1190, Standard Telephones and Cables TS4 and ESL50, and one 2 Kw G. 12C made by Re-diffusion. Power is taken from the A.C. mains, but automatically started diesel generators have been installed for emergencies. In the event of a power failure, the battery-driven starter motor is switched on by a relay, and the diesel cuts in. A similar arrangement provides alternative supply to the control tower when needed. All the remote receivers have auto-start motor generators driven from batteries.

As already mentioned in *Flight*, G.C.A. is installed, but is manned during the daylight hours only, by R.A.F. crews. S.B.A., B.A.B.S. and I.L.S. (SCS51) approach systems and the Eureka beacon are installed and working. Airfield Control Radar (A.C.R.) is being fitted now and should be in operation in the near future. Incorporated in this version of A.C.R. will be the Standard Radio Cathode Ray Automatic Direction Finder, Type P.V.1-B, similar to the equipment demonstrated to the P.I.C.A.O. delegates at Bassingbourn. An automatic and instantaneous bearing-indication by a single radial line is given of an aircraft transmitting on V.H.F. R/T. The controller thus has a plan view of the airport area with airborne aircraft indicated as individual spots of light, and the aircraft with which he is in contact by V.H.F. R/T. identified on the same screen. This is the first time such a combination of systems has been used commercially.

MILES MERCHANTMAN

RESEMBLING in essentials a scaled-up four-engined version of the Aerovan, the Merchantman freighter, lately announced, will be of all-metal construction. Four D.H. Gipsy Queen 30 engines will be fitted, giving a cruising speed of 155 m.p.h., and the undercarriage will be of fixed tricycle layout, though each of the two main units will, in fact, be composed of two wheels.

The manufacturers state that it was decided to use four power units, rather than two of equivalent power, primarily to meet the spirit as well as the letter of the I.C.A.O. requirements in respect of engine failure on take-off. They are con-

CIVIL AVIATION NEWS

fident that the Merchantman will be able to take-off on full load from start with one engine stopped.

The main cabin will have a total capacity of 780 cu ft and it will be possible to transform the aircraft in ten minutes from a freighter to a 20-seater passenger machine.

An "unstick" distance of 250yd is calculated and 50ft should be cleared in 575yd. Other estimated data are: stalling speed 60 m.p.h., max. rate of climb 1,150ft/min, max. still air range 850 miles. The span is 66ft 6in, all-up weight 13,000 lb, and disposable load, with 100 gall of fuel, 5,000 lb.

EDINBURGH TO PARIS

AIR FRANCE will be the first airline to open direct scheduled air services between Edinburgh and the Continent. From June 23rd, Dakotas will fly at a frequency of three times a week from Turnhouse to Paris. Surface transport, which is to be included in the fare, will leave Princes Street Station an hour before departure. Owing to some technical difficulties, probably in connection with night flying facilities at Turnhouse, the return journey will, at the outset, be made to Prestwick, and surface transport will be supplied from there to Glasgow.

I.C.A.O. AGREEMENT WITH U.N.O.

AT the International Civil Aviation Organization's first Assembly, which opened on May 6th, the delegates voted by 27 to 3 to accept the conditions for a working agreement with the United Nations. An amendment to the Chicago Convention conditional to the agreement was adopted to exclude Franco Spain from I.C.A.O. membership. Ireland, Portugal and Switzerland voted against the amendment, and Argentina and South Africa abstained from voting. The Spanish delegates left the assembly as a result of the resolution, and stated that Spain did not choose to remain in the status of an unwelcome guest. The amendment will require ratification by two-thirds of I.C.A.O. member nations before the agreement may be put into full effect.

The United Nations Organization has subsequently stated that, in view of the resolution concerning the relationship agreement, and in view of the withdrawal of the Spanish representatives from attendance at meetings of I.C.A.O., the secretary-general of U.N.O. considered that the agreement between the two organizations had then, on May 13th, come into force, and the secretary-general would report to the general assembly of U.N.O. accordingly.

Exclusion of Spain from I.C.A.O. will, it is hoped, not have any adverse effect upon international aviation. Although Spain will not be obliged to conform to I.C.A.O. operating standards, certain required standards will probably be woven into future agreements. In the interests of Spanish aviation the normal bilateral agreements will be necessary between Spain and those countries operating to Spanish airports.

The assembly also considered a motion to accept Italy as a member of I.C.A.O., and it is understood the motion was carried. France, Greece, Ireland and the United States spoke in favour of admitting Italy. The technical committee have asked the assembly to study the trend of aircraft design, with the object of curbing the increasing cost of runway construction. The resolution pointed out that although new techniques were being explored for the improvement of aircraft landing and take-off characteristics, and eventual runway requirements were not fully evident, if present trends continued, many member states would not be able to afford construction.

ITALIAN AIRLINES

TO quote Mr. Giuseppe Brusasca, writing in a recent issue of *Inter Avia* on the future resumption of Italian civil aviation, "In its effort to resume operations again Italian civil aviation is at present in a delicate state of transition." The reason for such a situation lies, in all probability, in the pre-war Italian policy of developing an abundance of international and colonial air routes without building up a system of internal services. There is, in consequence, a shortage of airports and adequate modern flying facilities. Mr. Brusasca named nine Italian companies who have already attempted to develop internal services, and it is understood the number is growing, even though aircraft and spares are scarce. Details of the two companies formed last year with British and American interests were given in *Flight* of January 2nd, and it will be remembered that the allocation of routes laid emphasis for the British on those to foreign destinations, and for the United States on Italy's internal connections. The British company, however, was also to link those international airports from which it would operate.

Mr. Brusasca, who is the Under-Secretary of State for Air in the Italian Defence Ministry, in a list of services to be covered by the Anglo-Italian company Alitalia, includes the following: Rome-Turin; Rome-Trieste; Rome-Catania; Milan-Bari-Catania; Turin-Milan-Venice-Trieste; Milan-Genoa-Naples-Palermo; Rome-Naples-Cagliari; and Cagliari-Milan. Two services, Rome-Turin and Rome-Catania, have actually started. Some delay has been occasioned by the shortage of aircraft, it being the policy of Alitalia to use Italian aircraft and employ Italian personnel as far as possible. The American company, L.A.I. are already flying three services but with war surplus Dakota aircraft. The inauguration ceremony of that company's airlines took place at Urbe Airport, near Rome, last month.

Alitalia has started with three-engined Fiat G.12s and will soon be using Fiat G.12Ls and four-engined Siai-Marchetti S.M.95s, and both powered by Pegasus 48 engines. At a later date the company hope to fly Fiat Z.18s with Hercules engines. The Breda-Zappata 308, a 50-ton four-engined transport, is being watched closely, and it is understood that B.E.A. have ordered Centaurus engines for trial purposes.

British European Airways have just flown out to Italy five Lancasters, on which Italian pilots will be trained. Mr. Brusasca states that in principle all foreign Government requests for landing rights are being approved by the Italian Government, but on conditions that proper bilateral agreements will be concluded as soon as possible.

INVASION: The U.K. Delegation to the I.C.A.O. Assembly in Montreal. Seated (l. to r.): Brigadier R. O. Wilberforce, Major K. M. Beaumont, Mr. C. M. Colbeck, Sir James Cotton, Mr. W. C. G. Cribbett, C.M.G. (Head of U.K. Delegation), centre; Major J. R. McCrindle, Mr. L. J. Dunnett, Mr. A. J. Edden, A. Cdre. G. P. Chamberlain. Air Chief Marshal Sir Frederick Bowhill was also a delegate.

BRITISH AIRCRAFT ON ORDER

IN answer to a recent question in the House of Commons, Mr. Wilmot, Minister of Supply, stated the types of British aircraft on order for the three British Corporations and gave the actual or estimated delivery dates of the first aircraft of each type. He said that the estimated dates of de-

CIVIL AVIATION NEWS

livery were necessarily provisional in the case of types still under development. Mr. Wilmot's list is reproduced, and the number of each type of aircraft on order for each Corporation has been added:—

Type	B.O.A.C.	B.E.A.C.	B.S.A.A.C.	Date
Viking	—	50 (provisional)	—	1946
Halton	12	—	—	1946
Plymouth ...	12	—	—	1947
Solent	12	—	—	1947
Tudor I ...	16	—	—	1947
Tudor II ...	26	—	—	—
Tudor IV ...	—	—	4	—
Tudor V ...	—	—	6	—
Sikorsky Helicopter ...	—	3	—	1947
Bell Helicopter ...	—	2	—	—
Wayfarer ...	(Fourteen on order by Ministry of Supply, but allocation under discussion.)			1948
Concordia ...	—	2	—	1948
Marathon—Gipsy Queen	—	25	—	1948
Mamba ...	—	25	—	—
Hermes ...	25	—	—	1948
D.H. 106 ...	(Actual number not disclosed.)			1950
Brabazon I ...	3 or 4	—	—	1950
S.R. 45 ...	3	—	—	1951

PROVING THE DOVE: Hunting Air Travel made a proving flight to Zurich on April 30th to test the Dove under operational conditions, and to demonstrate the aircraft. On the Swiss route the Dove will carry seven passengers and 38 lb of baggage for each.

FLYING-BOAT BASE REPORT

A MEMORANDUM on the report made by the Flying-boat base committee has been published. Members of the committee, of which Lord Pakenham was the chairman, were Mr. A. Gouge, Air Marshal Sir Leonard H. Slatter, Major R. H. Thornton, and Mr. Oliver Cochrane, the secretary.

Consideration was given to the fact that the best contribution the flying-boat would make to air transport was in the sphere of very large carriers. Thus, provision was made for flying-boats of at least double the size of any at present under construction, and the minimum length required for the main runway was assessed to be 5,000 yd. The minimum length for subsidiary runways was laid down as 3,500 yd, and the minimum depth of water required in all was 15ft.

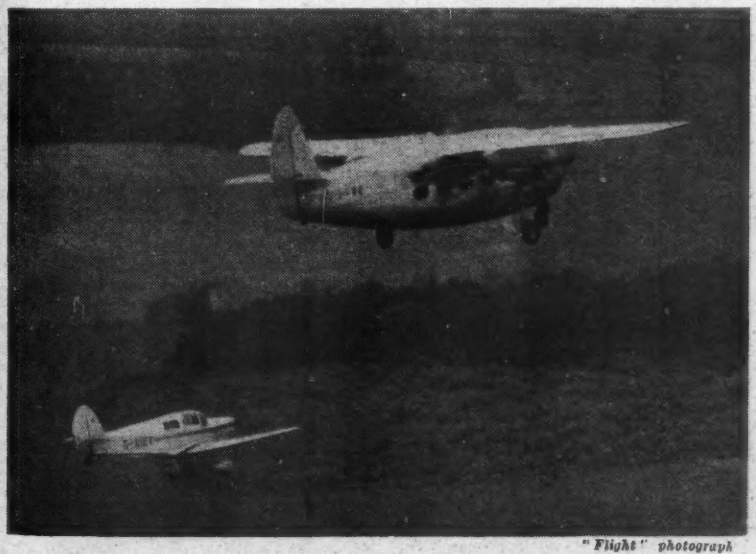
Forty-four sites were submitted for consideration, of which only the Bramble Shoal, in the Solent, Langstone Harbour, between Portsmouth and Hayling Island, and a site south of the Thames between Gravesend and the Medway, near Cliffe village, for the creation of an artificial lagoon, were selected for detailed examination. As the Southampton site was tidal it was immediately given third place.

Transit time from the selected site to London was thought to be of great importance, and it was found that, assuming new rail connections to the existing railway system, the journey from Cliffe would take 45 min, whereas from Langstone it would take 1 hr longer. The distance by road from Cliffe to Piccadilly Circus is 32 miles, and from Langstone 68 miles. A comparison of meteorological conditions revealed considerable disparity in the poor visibility records of the sites, the record of Langstone being about three times as good as that of Cliffe.

The committee reached the conclusion that the chief advantages of the Langstone site were the excellent weather and comparative low cost at which a base could be constructed.

The Ministry of Civil Aviation, however, have pointed out that it was only when Langstone Harbour was chosen that the question arose as to the bearing the choice would have on defence measures, and on the balance of national advantage the Government decided that national defence requirements should overcome the committee's choice.

A further review of other suggested sites is proceeding.



"*Flight*" *photograph*

DUCK'S DEBUT: Making its first public flight on May 16th (the third time airborne), the Percival Merganser 5/8 passenger light transport with D.H. Gipsy Queen 51 engines, is here seen approaching to land at Luton, with a Hunting Group Proctor as escort. A full description of the aircraft appears on pages 472-474.

NIMBUS SAILPLANE TESTED

BRITISH gliding clubs have been handicapped since the war by the scarcity of high-efficiency two-seater instructional machines. The Midland Gliding Club was recently given the opportunity of testing the Short Nimbus sailplane, a new low-wing tandem two-seater which was described in *Flight* of April 10th, and the report is interesting. The Nimbus, with an all-up weight of 1,200 lb, is considered heavy for a sailplane, but it behaved very well from a low launch of about 100ft, flying at approximately 40 m.p.h., the speed apparently most suitable for slow soaring. The Nimbus rose to 900ft above the launch within 10 seconds, and Mr. Espin Hardwicke, President of the Midland Gliding Club, writes: "Considering the lightness of the wind and the fact that we were flying at 42 m.p.h., she climbed steadily at from 2-4 ft/sec for two miles in the good lift spots. This is the normal rate of climb under similar conditions for a high-efficiency machine flying at 30-35 m.p.h. We soon worked our way up to 900ft and speed was then increased to 45-50 m.p.h. At 45-50 m.p.h. the Nimbus was losing height at 2-3 ft/sec."

From the club's report it appears that the Nimbus exhibited its one weakness during slow circling, when tail buffeting was

CIVIL AVIATION NEWS

felt which set up an oscillation throughout the fuselage. However, it is expected that Short's designers will soon overcome the fault, which is not noticeable at high speeds.

As mentioned in our previous report, the cockpit of the Nimbus provides adequate leg, elbow, shoulder and head space, and there is an uninterrupted view through the moulded Perspex enclosure

With the success of this prototype, jigs are being prepared for production, and gliding clubs may look forward to having an efficient two-seater dual-control sailplane.

BREVITIES

WE understand that seats will probably be available for fare-paying passengers in the first B.S.A.A. Tudor to fly on the route to South America.

* * *

Airways (India) have opened a service to operate three times a week between Calcutta and Bangalore, putting down at Vizagapatam and Madras. Dakotas are being used, with British, Indian and American aircrews.

* * *

I.A.T.A. Executive Committee have approved the formation of a special organization of medical officers for the purpose of solving medical and sanitation problems in the airlines.

* * *

Canadian airlines during December last year carried more than 57,000 passengers compared with 44,000 in the same month of the previous year. Traffic between Canada and the U.S. was increased by 15.5 per cent, and between Canadian cities by 30.5 per cent.

* * *

By next winter the New Zealand Government hope to have in operation a chain of radio ranges covering the commercial air routes across the country. The first four will be at Auckland, New Plymouth, Rongotai and Christchurch. As yet there are no blind-approach systems installed, but it should not be long before there is some such system at Whenuapai, Auckland, the international civil airport of New Zealand.

The probable cause of the T.W.A. Constellation crash at Shannon on December 28th was an error in altimeter reading. The C.A.B. states that there had been an inadvertent reversal of the primary and alternative static lines during a routine check. Readings were, consequently, lower. It was found that no test was made of the static system after the instrument panels had been reinstalled, although maintenance forms had indicated that tests had been made.

* * *

The route mileage flown by British European Airways' Continental Division increased from 8,869 miles in March to 10,290 miles in April. The number of services operated were also increased from 491 to 653 in the same two months. The introduction of services to Geneva on May 19th has brought the total number of routes flown by B.E.A. up to seventeen, and the route mileage to 10,519. Total services are now 624, the greater number in April being due to additional services at Easter.

* * *

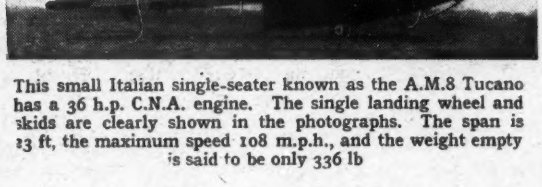
On June 14th the B.O.A.C. services between London and New York will be increased from five to six per week. With the once-weekly service between London and Montreal, which opened last month, a B.O.A.C. transatlantic Constellation will arrive and depart from London Airport every day of the week. It is understood that the service to New York is fully booked up until August and to Montreal well into November.

FROM THE CLUBS

MEMBERSHIP is steadily increasing at the Strathtay Aero Club, which at the moment possesses two Tiger Moths. A new Auster Autocrat is expected soon. Flying was naturally held up during the bad weather, but in the early part of April members flew quite a number of hours, and four night flights were made to qualify for "B" licences. The chief instructor of the club is S/L. E. Bradley.

* * *

We hear from the Oxford Aeroplane Club that a number of new members have recently been enrolled, and a Hornet Moth has been acquired. The club fleet now consists of the Hornet and two Tiger Moths. Both dual and solo flying rates are to be charged at the rate of £3 5s per hour on any of the club aircraft. Visitors to the club will find that the Oxford airport has landing runs of one mile in most directions. The area covered by the airfield is 350 acres, and it may be reckoned as one of the finest grass landing grounds in the country. Mr. C. F. Cockburn takes up his duties as chief flying instructor on June 1st. Meanwhile, flying instruction is in the hands of F/L. L. W. Wenman. There is ample hangar accommodation at Oxford for private owners and, we are told, plentiful supplies of fuel.



This small Italian single-seater known as the A.M.8 Tucano has a 36 h.p. C.N.A. engine. The single landing wheel and skids are clearly shown in the photographs. The span is 23 ft, the maximum speed 108 m.p.h., and the weight empty is said to be only 336 lb

* * *

Plans for new quarters with club facilities for Airwork Flying Club Ltd. have had to be postponed temporarily. W/C. Davy, chief flying instructor, who was at Heston in the same capacity in the old days, is nevertheless ready to welcome further pupils at their temporary Denham headquarters. He has three Tiger Moths, a Whitney Straight and a Miles Messenger due for delivery shortly. All these machines will be available on a "hire and fly yourself" basis at £10 a day.

* * *

The Luton Flying Club have acquired this month a twin-engined de Havilland Rapide. The aircraft, G-AIVM, is an 8-seater painted blue and silver, in the colours of the Hunting flying clubs. It will be used for joy flights for the public and for air excursions by members of the Luton club and their friends.

* * *

The Yorkshire Aeroplane Club in conjunction with the *Yorkshire Evening News* are to present three flying scholarships, one to a man, a second to a woman, and a third to a member of the Yorkshire region of the Women's Junior Air Corps. The scholarships will be worth £70 each. Applicants for the scholarships will pay £1 to the Yorkshire Aeroplane Club to take an initial aptitude test, and those selected will be trained to "A" licence standard.

* * *

The Reading Aero Club, which is in the process of reorganization, announces that it will be pleased to hear from all previous and potential members. The club will be operating from temporary premises on the east side of Woodley Airfield, and has a number of Miles aircraft at its disposal. It is hoped that the club will be in a position to start operations during June.

* * *

At Thruxton Down recently Mrs. Taylor Young, who is the first woman member of the Wiltshire School of Flying to gain her post-war "A" licence, christened Mr. W. J. Abernethy's Miles Gemini, *City of New Sarum*. Mr. Abernethy is the first post-war member to become an owner. His aircraft will be flown by F/L. K. Birt, on air taxi work as an extension to his present car hire service.

CORRESPONDENCE

The Editor does not hold himself responsible for the views expressed by correspondents. The names and addresses of the writers, not necessarily for publication, must in all cases accompany letters.

SOMETHING IN A NAME

Suitability to Purpose

AFTER "Spitfire," "Seafire," "Spiteful" and "Seafang," the name "Attacker" for the Supermarine E.10/44 seems weak and inappropriate. Why not Scornful, Scourge, Scorpion, Swift, Squall, Shatterer, Spectre, Stilletto or even Sprite?

CHRISTIAN DELFONT.

AVRO BULLSEYE

How a Great Firm was Started

From Sir Alliott Verdon-Roe

MAY I correct a statement made in the article on the career of Capt. H. A. Brown? In 1909 John Lord was on the staff of Everard and Co., makers of Bull's Eye braces and surgical webbing, which business was owned by my brother "H. V." It was my brother who financed my experiments about this period, after I had exhausted my savings and sold most of the £500 worth of prizes that I had won for cycle racing. A. V. Roe and Co., Ltd., was formed in 1910.

A. VERDON ROE.

P.S.—By the way, "In 1909 young A. V. Roe" was 32 years old.

BLIND-APPROACH PRESENTATION

"Off the Beam" Confusion

I WOULD like to congratulate the author of the article on "Blind-Approach Presentation" in your issue of May 8th, by virtue of the novel method he describes, on his grasp of the vital importance of natural and realistic presentation of approach data to the pilot.

There are, however, a number of comments that come to mind immediately:—

(a) The indications of deviations from the desired paths must, surely, be graduated according to their degree, and their sensitivity must vary inversely with range. In the system he describes there is no information "off the beam," and if the attention has to be transferred to the normal indications when his picture "blacks out," and back again when it re-appears, confusion is almost bound to arise.

(b) Derivation of continuous range information is essential apparently, which is not available with either S.B.A. or I.L.S. The value of marker beacons for this purpose is very doubtful.

(c) The use of a sensitive altimeter during an approach indicating every pot-hole and mole-heap beneath the aircraft, I found practically useless, not to say extremely irritating. In any case, beam distortions must surely be dismissed from any serious consideration of the problem. Finally, I am not altogether sure that the process of landing in daylight is quite as simple as he imagines.

"VERTIGO."

PARACHUTE AIR MAIL

A Neglected Aspect of Flying

RECENT correspondence and editorials in *Flight* have tended to draw attention to the problems of air mail, but as far as I know the possibilities of parachute delivery of air mail and, indeed, of goods, has not been thoroughly explored or exploited in any country. Five years' experience in charge of parachute development work during the war years for airborne forces and for the Resistance Movements has shown me that it is unsafe to say that delivery of any commodity by parachute is impossible. I was responsible largely for the carriage and delivery of goods ranging from boots to binoculars, pots to printing presses, and jars of rum to jeeps, for the Maquis, and we were completely successful in developing the necessary equipment, often at the shortest notice. The same technique could be utilized for the delivery of air mail and goods, if not men, by parachute, under very much more favourable reception conditions. Reliability in operation is virtually one hundred per cent, while the containers can be made to ensure against damage on impact of the most fragile stores—on one occasion, as an exhibition, one dozen new-laid eggs were dropped in a package by parachute, and only one shell was cracked—and it was claimed that this was flawed before dropping!

The aircraft which operated these stores by parachute are still in use, and could be made available for operations at once. With lighter weight supply dropping, such as air mail, delivery could be made from standard aircraft used on main or feeder lines. The provision of a dropping zone is a far simpler and cheaper matter than the making of a landing ground, and deliveries can be made along the route without the loss of time associated with landing, unloading, and taking-off. At these points of central distribution, goods, men and mails can be dropped off for collection and local delivery, while the picking up of stores and mails whilst airborne presents no difficulties. Release can be made in most cases by hand, or can be made automatically from external bomb-racks or internal rail-racks releasing through a hatch. This scheme offers many advantages over the use of helicoptors, and would certainly assist in bringing the outposts a little nearer home.

S/L. H. R. BUNN, M.B.E.

GETTING THE BIRD

Job for the Standards Association

IN February of this year the Airworthiness Division of P.I.C.A.O. met in Montreal, when, among others, the opinion was expressed that there should be "a requirement to ensure safety in the event of an aircraft striking a bird," and that an international standard bird should be proposed. The following remarks were extracted from a (so far) unverified verbatim report.

The U.S.A. delegate proclaimed that on this point there could not be two opinions, since the eagle fulfilled all requirements, but Herr Bottelwascher (Ruritania) enquired whether such an eagle would be considered as single- or doubled-headed.

Signor Enthusio (Republic of San Marino) protested that the small nations could agree only to the adoption of a small bird. In the course of a torrential but somewhat inconsequent speech he was understood to deliver a lecture on the habits of woodpeckers, shrikes, marabouts, pelicans, and the lesser toecapped scratchpoll.

Sir Foxley Salmonstein (British West Hampstead) was of the opinion that the whole thing was deuced unsporting, dontcherknow! Would there be a closed season for the shooting of birds from civil or Service aircraft, and who would enjoy the shooting rights out of gun range from the ground? Mynheer Bols van Damm (Holland) urged that the rights, in a depopulated Europe, of storks should be fully respected.

A delegate, believed to be Irish, asked if the meeting had considered the possibility of the discovery, at altitudes so far unexplored, of prehistoric and/or unknown monsters. He pleaded for the adoption also of an international standard pterodactyl.

X. E. R.

FORTHCOMING EVENTS

May 24th—Cannes Air Rally.
May 24th and 26th.—Isle of Man Air Races. Ronaldsway Airport.
May 29th.—Royal Aeronautical Soc.: Thirty-fifth Wilbur Wright Memorial Lecture "The Development of All-wing Aircraft." To be read by J. K. Northrop.
May 31st and June 1st.—Lochleven Aero Club Flying Meeting. Balado Airfield, nr. Milnathort, Kinross.
June 4th.—R.Ae.S. (Luton): "Fuels and Oils for Aircraft Turbine," Dr. C. G. Williams, Ph.D.
June 14th and 15th.—Royal Artillery Aero Club rally. Thruxton Airfield.
June 14th.—Inst. of Physics: Summer Meeting: "Cathode Emission."
June 14th.—Air League of the British Empire: Display at Baginton Airfield, Coventry.
June 20th and 21st.—Derby Aero Club. International air rally. Burnaston Airport.
June 22nd.—Swiss Aero Club. International model contests.
June 25th.—S.B.A.C. Annual General Meeting.
June 28th and 29th.—Luton Flying Club: Summer meeting, display and competitions.
July 2nd to 23rd.—Air League of British Empire. Blackpool (Squires Gate) Flying displays with R.A.F. support on 9th, 16th and 23rd.
July 4th to 20th.—Brussels International Aero Show.
July 5th to 7th.—Le Touquet Aero Club. Aerial rally.
Sept. 3rd to 6th.—Royal Aeronautical Society: Aeronautical Congress.
Sept. 9th to 12th.—S.B.A.C. Exhibition and Display.

SERVICE AVIATION

"Flight" photograph.

FLYING COASTAL COLOURS: A Bristol Brigand performs at the demonstration before the R.A.F. School of Air Support.

Awards

THE KING has been graciously pleased to approve the following awards:

Additional Members of the Military Division of the Most Excellent Order of the British Empire.

F/L. Wilfred Arthur Wise, R.A.F.V.R., No. 12 Squadron.

W/O. Joseph Farrag, R.A.F.V.R., No. 7 Squadron.

W/O. Clifford Street, R.A.F.V.R., No. 51 Squadron.

Prince Bernhard at Tern Hill

EARLY on the morning of May 14th Prince Bernhard of the Netherlands arrived at Hendon, and later took off in a Dakota for Tern Hill to present wings to twenty-three cadets of the Royal Netherlands Air Force. While in England Prince Bernhard will decorate several British and Allied pilots.

R.A.A.F. in Peacetime

ACCORDING to a plan presented to the Australian Cabinet, Australia's permanent peacetime air force will have a strength of 11,900 officers and men and will cost £12,500,000 a year. Before demobilization started, the strength of the R.A.A.F. was 159,000.

"603" Over Edinburgh

SIX clipped-wing Spitfire XVIs of No. 603 (City of Edinburgh) Squadron, A.A.F., circled Edinburgh on May 10th before making a low-level fly-past over Turnhouse to mark the first occasion that the Squadron has been airborne—as a unit—since it was disbanded soon after the war. As an observer points out, six fighters do not make a squadron, and 603 has far to go before it is back to its old strength and high rank among the country's Auxiliary units. However, the unit has re-formed, and numbers of pre-war air and ground crews have come back to see that the foundations are firm. The Commanding Officer is S/L. G. K. Gilroy, D.S.O., D.F.C., and the Hon. Air Commodore is Sir William Y. Darling, M.P., who inspected the men and the aircraft after the display.

Royal Air Force and Naval Aviation News and Announcements

Battle of Britain Claims

IN a reply to a question by Mr. Keeling, Mr. Noel Baker, Secretary of State for Air, has given drastically revised figures for the number of enemy aircraft destroyed during the Battle of Britain. The House would agree, he said, that this retrospective correction of claims, which were honestly put forward, did nothing to diminish the achievements or to dim the glory of the men who fought so bravely against great odds. Figures circulated showed that during the opening and concluding phases of the battle, while the numbers of aircraft engaged were relatively small and the fighting less continuous and intense, the losses actually inflicted on the enemy were higher than those claimed by the R.A.F. However, when large forces were engaged, and the battle raged without respite for many days, the estimates were well above the losses which the Luftwaffe sustained. Thus on September 15th, 1940, when 185 aircraft were claimed destroyed by the R.A.F. and A.A. Command the real figure was 56 destroyed.

Figures for the German losses were taken from official returns of aircraft required as replacements. Airframe numbers were quoted, and the Air Ministry accepts the returns as accurate.

The following table was contained in a statement circulated by Mr. Noel Baker:—

LOSSES OF GERMAN AIRCRAFT IN THE BATTLE OF BRITAIN ACCORDING TO CONTEMPORARY R.A.F. ESTIMATES AND OFFICIAL GERMAN RECORDS.

DATE	R.A.F. ESTIMATE	GERMAN LOSSES	
	Destroyed	Destroyed	Damaged
10TH JULY–7TH AUG.—Preliminary Phase of the Battle	188	192 (63)	77
8TH AUG.–23RD AUG.—Attack on Coastal Targets	755	403 (213)	127
24TH AUG.–6TH SEPT.—Attacks on Fighter Command Airfields ...	643	378 (243)	115
7TH SEPT.–30TH SEPT.—Daylight attack on London chiefly by Heavy Bombers ...	846	435 (243)	161
1ST OCT.–31ST OCT.—Daylight attack on London chiefly by Fighter Bombers ...	260	325 (134)	163
TOTAL LOSSES DURING THE BATTLE	2,692	1,733 (896)	643

DAYS OF MOST INTENSIVE FIGHTING.

DATE	R.A.F. ESTIMATE	GERMAN LOSSES	
	Destroyed	Destroyed	Damaged
15TH AUGUST	183	76 (32)	9
18TH AUGUST	155	71 (36)	23
31ST AUGUST	94	39 (32)	14
2ND SEPTEMBER ...	66	34 (23)	12
7TH SEPTEMBER ...	100	40 (26)	13
15TH SEPTEMBER ...	185	56 (43)	21
27TH SEPTEMBER ...	153	55 (38)	12

NOTE.—*Figures in brackets show the losses admitted in communiques issued at the time by the German High Command.*

True Benevolence

THIRTY houses for disabled R.A.F. officers and airmen and their families are being built at Cardiff, Leicester and Morden (Surrey) at a cost of £53,000, states the annual report of the R.A.F. Benevolent Fund just published. Some of the houses will be allocated to R.A.F. widows with young children. The report also announces that this summer a school for the sons of deceased airmen will re-open at Vanbrugh Castle, Blackheath, London, S.E. This school, damaged by bombing during the war, will accommodate 45 pupils from the age of seven upwards, and will aim at providing them with a start in life when their education is completed.

W.A.A.F. Enrolment

AS from June 1st, 1947, airwomen will be enrolled in the W.A.A.F. on a two years' engagement instead of the present enrolment for "duration of present emergency." It is hoped that the nucleus of the post-war women's side of the Royal Air Force will be formed from amongst those enrolled under the new system and from those who extend their service or return to the W.A.A.F. under the extended service scheme announced last November.

The "R.A.F. Review"

FORMER, as well as serving, members of the R.A.F. and W.A.A.F. will soon be able to obtain the *R.A.F. Review*. Beginning with the July issue, the annual subscription will be 7s 6d. Members of the R.O.C. and A.T.C. may also become subscribers, but the *Review* will not be sold to the general public.

A.A.F. Regiment Squadrons

FOUR Light A.A. Squadrons of the Auxiliary Air Force Regiment will begin recruiting on June 1st in the Middlesex, Edinburgh, Gloucester and West Riding areas. The chief need is for ex-R.A.F. Regiment members, but other men, particularly those with gunnery experience, may also apply.

Each squadron will be fully mobile and equipped, in the same manner as a regular Regiment squadron, as a first-line defence unit for local A.A. and ground defence. The Regiment squadrons will combine for some exercises with the local A.A.F. flying squadron.

Headquarters will be at Stanmore for No. 2604 (Middlesex) Squadron, at Turnhouse for No. 2603 (Edinburgh) Squadron, at Filton for No. 2501 (Gloucester) Squadron, and at Yeadon for No. 2609 (West Riding) Squadron. Applicants should write to the Adjutant of the squadron concerned.

Training will take place at week-ends, evenings, and an annual 15 days' camp. There is an annual bounty for men, as well as a travelling allowance and pay or expenses allowance for all ranks for training periods.

VISIT OF ENCOURAGEMENT: G/C. Douglas Bader has been visiting the U.S.A., where he has toured Army hospitals to encourage "amputees." G/C. Bader, whose artificial legs permit him to dance and play tennis, is seen with General Doolittle, vice-president of the Shell Union Oil Corp., by which Bader is employed.

A 2-Group Departure

ON May 2nd, at No. 2 Group Headquarters, Gutersloh, Germany, a farewell dinner and guest night was held to say goodbye to the Air Officer Commanding, A. V-M. A. L. Paxton, C.B., D.F.C. Among those present were the Air Officer Commanding in Chief, British Air Forces of Occupation, Air Marshal Sir Philip Wigglesworth, K.B.E., C.B., D.S.C., and A. V-M. P. E. Maitland, C.B., M.V.O., A.F.C. Also visiting were A. Cdre. R. L. R. Atcherley, C.B.E., A.F.C., A. Cdre. L. W. Cannon, C.B.E., and A. Cdre. C. H. Flinn, C.B.E.

Air Marshal Wigglesworth gave some statistics concerning 2 Group, which started the war with 79 Blenheims and finished with over 260 Mosquitoes and Mitchells. They operated on the first day of the war against the German fleet at Wilhelmshaven and Cuxhaven, and on the last days of the war were bombing a marshalling yard and airfield not far from these naval depots. In the 5¼ years between these attacks the Group completed just over 57,000 operational sorties.

Trainees from Burma

FIFTY Burmese youths recruited for the Burma Air Force will leave shortly for London to train with the Royal Air Force. On return to Burma they will become instructors at an Air Force Training Centre to be established in accordance with the proposed defence scheme.

GREETING AT NORTHOLT: Mr. Churchill greeting the crew of the Transport Command Avro York in which he flew to Paris on May 9th to receive his Medaille Militaire.

"Met." Mosquitoes in N.W. Europe

GREAT credit for their contribution to the efficient meteorological service in North West Europe is due to No. 139 Wing of the British Air Forces of Occupation in Germany, whose Mosquitoes, based at Wahn, make two regular upper-air ascents daily to take readings and observations up to 30,000ft. For the purpose of accuracy it is necessary for the Mosquitoes to make the ascent within a column of air having a maximum radius of 10 miles, and as the navigator is engaged most of the time in reading meteorological instruments, the aircraft are controlled by a fighter director post.

Apart from taking the instrument readings, record is kept of the height of base and tops of cloud, the amount and type of cloud, details of precipitation, icing conditions and the formation of condensation trails. All the information gathered is passed to the duty meteorological officer, who codes it and passes it on to Air Headquarters, Germany, whence it is signalled to every meteorological station.

The flights are made at first light and at noon each day, and in spite of the length and severity of the German winter remarkably few have been cancelled. On some occasions the aircraft have run into

SERVICE AVIATION

heavy icing, with anything up to four inches on their wings, and on several days landings were made in the middle of snowstorms, fetching ground crews out of their beds before dawn to de-ice and service the aircraft ready for the next climb.

Hangar Into Church

A DISUSED hangar at No. 5 R.A.F. Recruits' Centre, West Kirby, Cheshire, has been converted into a church. All ranks have assisted. Over the altar is a rare tapestry, the gift of Mrs. Rea-Dodson. It is hoped that the Bishop of Chester will dedicate the church this month.

More V.R. Schools Open

SEVEN more R.A.F.V.R. flying schools have lately opened, at Cambridge, Panshanger (Hertford), Rochester, Desford (Loughborough), Fairoaks (Surrey), Wolverhampton and Sywell (Northampton). This brings the total number of Reserve Flying Schools up to eleven. The first four, which opened in April, were Woodley (Reading), Brough (Hull), Derby and Perth.

Royal Marines and R.A.F. Regiment

THE Air Ministry offers a number of short-service commissions in the R.A.F. Regiment to non-regular officers of the Royal Marines. Whilst serving on short-service commissions, officers will be eligible for consideration for appointment to permanent commissions. Officers released within the last six months may apply. Further information can be obtained from The Commandant General, Royal Marines, Queen Anne's Mansions, St. James's Park, S.W.1.

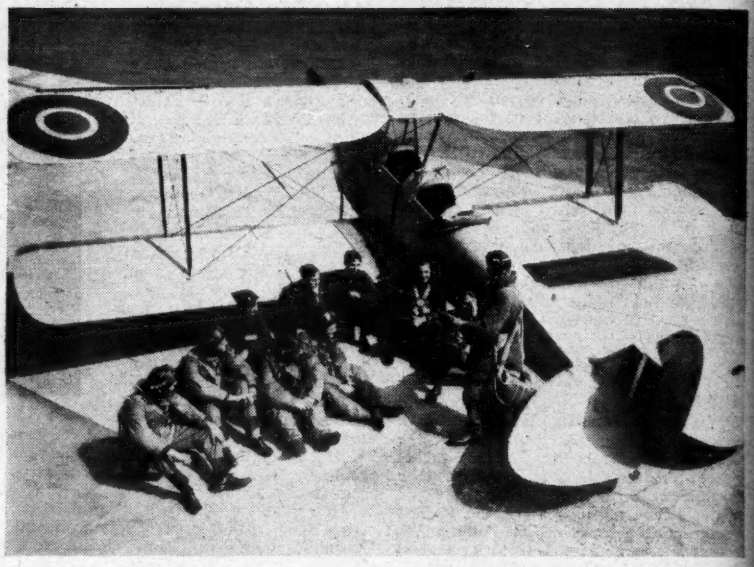
Aircrew Psychological Disorders

H.M. STATIONERY OFFICE publishes, at 7s 6d net, a collection of studies of representative aspects of flying stress in the R.A.F. during the war. The papers have been selected from numerous investigations on psychological disorders of air crews, undertaken during the war for the Flying Personnel Research Committee by R.A.F. consultants and specialists in neuro-psychiatry. Of topical interest, they give the reader a view from the medical angle of the strain endured by operational air crews.

Although nervous breakdowns did occur, the incidence was lower than might have been expected. The new book shows how measures were devised to lighten the load and help men to carry it.

Medway Towns V.R. School

RECRUITING has started for the Medway Towns V.R. School. S/L. Holt is the C.F.I. and flying will start quite soon at Rochester Airport with Tiger Moths and, later, with Prentices and Oxfords. There is accommodation for about seventy-five officers and seventy-five N.C.O.s in the mess, and an airmen's canteen will open as soon as it is required. The school is hoping to recruit about 300 pilots and in about five weeks' time will start enlisting navigators, wireless operators and flight engineers. The address of this School is: No. 4 Reserve Centre, Cuxton Court, Rochester.



TALE OF A TIGER: A summery scene at Woodley with A.T.C. Cadets absorbing ultra-violet rays and some good counsel on the handling of the D.H. Tiger Moth.

New Mosquito Variants

WITH the announcement several months ago of the Mosquito Marks 34, 35 and 36, it might reasonably have been supposed that this great line of aircraft would be without further issue. A few days ago, however, the manufacturers announced the TR Mk. 37 carrier-borne strike aircraft, the NF Mk. 38 night fighter and the TT Mk. 39 target tower.

Developed to replace the Mk. 33, the first twin-engined aircraft to land on an aircraft carrier, the Mk. 37 differs mainly in equipment, being fitted with British radar in place of the American A.S.V. equipment. To accommodate the new gear the nose has been enlarged and resembles generally that of the night fighter Mosquito. The war load remains unaltered. With its two Rolls-Royce Merlin 25s, the Mosquito TR 37 has a maximum speed at sea level of 345 m.p.h., and at 20,000ft attains 383 m.p.h. The normal still-air range with 405 gallons of fuel is 1,100 miles, with the usual allowances for take-off and climb.

As in the case of the Mk. 37, the only major difference between the Mk. 38 and the earlier Mk. 36 is in the radar installation, the American Mk. X A.I. gear having been replaced by the British Mk. IX. Here the difference is less apparent externally, since the enlargement of the nose is only noticeable in plan view. The cockpit enclosure has been lengthened forward by some 5in to allow for associated equipment to be installed on the pilot's side. The difference in weight is not sufficient to affect performance.

A new departure in Mosquito development is represented by the Mk. 39 target tower, the design and construction of which were undertaken by General Aircraft, Ltd. Not only will this new Mark function as a target tower but is designed itself to act as a target. For instance, it may be used to make dummy attacks on a ship, the A.A. gunners using live ammunition but laying their guns with a fixed error of, say, 10 deg. in azimuth, but correctly in elevation and range. The shells, therefore, should burst at the correct altitude and to one side, the bursts being recorded by a cameraman in a glazed position built as an extension to the nose of the aircraft.

A second new crew position is provided for a rearward-facing observer, who is responsible for drogue operation. The drogue is streamed from an electric winch in the bomb bay, and power for the winch is supplied by a wind-driven generator mounted on an arm which retracts into the bomb bay when not in use.

The engines of the Mk. 39 Mosquito are Merlin 25s with single-stage two-speed superchargers, each giving 1,610 b.h.p. at take-off.

Reunions

A REUNION dinner for all ranks of the Air Disarmament staffs and formations of B.A.F.O. (Germany) will be held at the Connaught Rooms on July 19th. Tickets are 25s and applications should be made to W/C. S. G. Walker, O.B.E., R.A.F. Station, Kemble, Glos., before July 1st.

* * *

The second dinner for officers of the Reunion Association of No. 313 M.U. R.A.F. Kankinara and Cossipore, Bengal, will take place at the Midland Hotel, Manchester, 2, at 6 p.m. (for 7) on May 31st. All officers of 313 M.U. are invited. Tickets 13s 6d plus service. Notify N. Mills, 173, Frederick Street, Oldham, Lancs, or S/L. P. Cartridge, 3/44 Cranley Gardens, London, S.W.7.

* * *

A reunion meeting of No. 382 (Westminster) Squadron, A.T.C., will be held on May 30th at 7 p.m. at Shelleys, Albemarle Street, W.1, with the object of forming an association. All interested can obtain particulars from A. C. Porter, 33, The Little Boltons, S.W.10.